

Discovery Report

Lake Ontario Oak Orchard-Twelvemile Watershed, HUC 04130001

Genesee, Monroe, Niagara, and Orleans Counties, New York*

**These counties span more than one watershed; please see following page for a list of communities fully or partially located in the watershed. This report covers only the Oak Orchard-Twelvemile Watershed in the State of New York.*

Report Number 01
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Federal Emergency Management Agency
Department of Homeland Security
26 Federal Plaza
New York, NY



FEMA

Project Area Community List

This list includes all communities located fully or partially within the Oak Orchard-Twelvemile Watershed. While all communities may be under consideration for a revised Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) and/or Flood Insurance Rate Map (FIRM), it is important to note that not all communities will receive new/updated FEMA FISs or FIRMs as a result of this study.

Genesee County

Alabama, Town of*

*Batavia, Town of***

*Byron, Town of***

Elba, Town of*

Elba, Village of

Oakfield, Town of

Oakfield, Village of

Monroe County

Brockport, Village of

Clarkson, Town of

Gates, Town of*

Greece, Town of*

Hamlin, Town of

Hilton, Village of

Ogden, Town of*

Parma, Town of

*Rochester, City of***

Spencerport, Village of

Sweden, Town of*

Niagara County

Barker, Village of

Cambria, Town of*

Hartland, Town of

Lewiston, Town of*

Lewiston, Village of*

Lockport, City of*

Lockport, Town of*

Middleport, Village of

Newfane, Town of

Porter, Town of

Royalton, Town of*

Somerset, Town of

Wilson, Town of

Wilson, Village of

Youngstown, Village of*

Orleans County

Albion, Town of

Albion, Village of

Barre, Town of

Carlton, Town of

Clarendon, Town of*

Gaines, Town of

Holley, Village of

Kendall, Town of

Lyndonville, Village of

Medina, Village of

Murray, Town of

Ridgeway, Town of

Shelby, Town of*

Yates, Town of

*Partially within the Oak Orchard-Twelvemile Watershed

***Partially within the Oak Orchard-Twelvemile Watershed but not included in this Discovery Report due to inclusion within other Discovery Processes, lack of flooding sources and/or due to unpopulated area or development.*

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Acronyms and Abbreviations

AAL	Average Annualized Loss
BFE	Base Flood Elevation
CAC	Community Assistance Contact
CAV	Community Assistance Visit
CBRS	Coastal Barrier Resources System
CFR	Code of Federal Regulations
CFS	Cubic Feet Per Second
CID	Community Identification Number
CIS	Community Information System
CNMS	Coordinated Needs Management Strategy
CRS	Community Rating System
DFIRM	Digital Flood Insurance Rate Map
DMA2K	Disaster Mitigation Act of 2000 (DMA2K)
FEMA	Federal Emergency Management Agency
FHBM	Flood Hazard Boundary Map
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FIPS	Federal Information Processing Standard
GIS	Geographic Information System
Hazus-MH	Multi-Hazard Risk Assessment and Loss Estimation Software Program
HMGP	Hazard Mitigation Grant Program
HMP	Hazard Mitigation Plan
HWM	High Water Mark
HUC	Hydrologic Unit Code
LiDAR	Light Detection and Ranging
LOMA	Letter of Map Amendment
LOMC	Letter of Map Change
LOMR	Letter of Map Revision
LOMR-F	Letter of Map Revision based on Fill
MS4	Municipal Separate Storm Sewer System
NAVD88	North American Vertical Datum of 1988
NDBC	National Data Buoy Center
NFIP	National Flood Insurance Program
NGVD29	North Geodetic Vertical Datum of 1929

NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
NYSDEC	New York State Department of Environmental Conservation
RAMPP	Risk Assessment, Mapping, and Planning Partners
Risk MAP	Risk Mapping, Assessment, and Planning
RL	Repetitive Loss
SFHA	Special Flood Hazard Area
SPDES	State Pollutant Discharge Elimination System
SWCD	Soil and Water Conservation District
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey

Glossary of Terms

1-Percent-Annual-Chance Flood: The flood having a 1-percent chance of being equaled or exceeded in any given year. This is the regulatory standard also referred to as the base flood or the “100-year flood”. The base flood is the national standard used by the National Flood Insurance Program (NFIP) and all Federal agencies for the purposes of requiring the purchase of flood insurance and regulating new development. Base Flood Elevations (BFEs) are typically shown on Flood Insurance Rate Maps (FIRMs). The standard constitutes a reasonable compromise between the need for building restrictions to minimize potential loss of life and property and the economic benefits of floodplain development. ([FEMA](#))

0.2-Percent Annual Chance Flood: A flood that has a 0.2-percent chance of being equaled or exceeded in any given year; also known as a 500-year flood.

Base Flood Elevation (BFE): The computed elevation to which floodwater is anticipated to rise during the base flood. BFEs are shown on a community’s FIRM and on the flood profiles in the Flood Insurance Study (FIS). The BFE is the regulatory requirement for the elevation or floodproofing of structures. The relationship between the BFE and a structure's elevation determines the flood insurance premium.

Approximate Study: A flood hazard study that results in the delineations of floodplain boundaries for the 1-percent-annual-chance flood, but does not include the determination of base flood elevations or floodways. ([Delta Flood Council](#)) An approximate study is represented on a FIRM by a [Zone A](#).

Declared Disaster: An emergency declaration triggers aid that protects property, public health, and safety, and lessens or averts the threat of an incident becoming a catastrophic event. A major disaster declaration, issued after catastrophes occur, constitutes broader authority for Federal agencies to provide supplemental assistance to help State and local governments, families and individuals, and certain nonprofit organizations recover from the incident.

Detailed Study: A flood hazard mapping study done using hydrologic and hydraulic methods that produce BFEs, floodways, and other pertinent flood data. Detailed study areas are shown on the FIRM as [Zones AE, AH, AO, AR, A99, A1-A30, and in coastal areas Zones V, VE, and V1-30](#).

FIRM panel: In order to print the FEMA FIRM at a scale of (generally) 1-inch to 500- or 1,000-feet, the FIRM for a community is broken out into several physical paper or electronic maps that together form a community’s complete FIRM. ([Harris County Flood Control District](#))

Flood Insurance Study (FIS): A compilation and presentation of flood risk data for specific watercourses, lakes, and coastal flood hazard areas within a community. When a flood study is completed for the NFIP, the information and maps are assembled into an FIS. The FIS report contains detailed flood elevation data in flood profiles and data tables. (FEMA)

Geocode: Geocoding is the process of transforming a description of a location—such as a pair of coordinates, an address, or a name of a place—to a location on the earth's surface. You can geocode by entering one location description at a time or by providing many of them at once in a table. The resulting locations are output as geographic features with attributes, which can be used for mapping or spatial analysis. ([ArcGIS Resource Center](#))

Multi-Hazard Risk Assessment and Loss Estimation Program (Hazus): A nationally applicable standardized methodology that contains models for estimating potential losses from earthquakes, floods, and hurricanes. Hazus uses Geographic Information Systems (GIS) technology to estimate physical, economic, and social impacts of disasters. It graphically illustrates the limits of identified high-risk locations due to [earthquake](#), [hurricane](#), and [floods](#). (FEMA)

Hydrology: The science that encompasses the occurrence, distribution, movement and properties of the waters of the earth and their relationship with the environment within each phase of the hydrologic cycle. The [water cycle](#), or hydrologic cycle, is a continuous process by which water is purified by evaporation and transported from the earth's surface (including the oceans) to the atmosphere and back to the land and oceans. ([USGS](#))

Light Detection And Ranging (LiDAR): LiDAR is an active remote sensing technique similar to radar, but uses light pulses instead of radio waves. LiDAR is typically “flown” or collected from planes and produces a rapid collection of points (more than 70,000 per second) over a large collection area. Collection of elevation data using LiDAR has several advantages over most other techniques. Chief among them are higher resolutions, centimeter accuracies, and penetration in forested terrain. ([NOAA](#))

Limited Detailed Study: A flood hazard study that is assigned to certain areas previously designated as approximate Zone A flood zones where communities have requested upgraded flood hazard analyses, but due to the low level of projected development or budget limitations, a detailed study is not performed. It is also applied to lakes that do not have level gauge data. In New York these enhanced zones are created using the following data and methodologies: digital orthophotos, LiDAR, limited survey of structures, nomination of flow rates, and the development of HEC-RAS hydraulic models.

The term “limited survey” refers to the survey of man-made hydraulic obstructions, such as dams, bridges and culverts, and to the survey of the outlet channels of lakes with natural outlet controls. The purpose of collecting “limited survey” is to enhance the accuracy of the hydraulic model thus allowing the development of Advisory BFEs at selected cross sections. Engineering drawing plans and Department of Transportation hydraulic studies may have been substituted for limited survey, where appropriate and available. (FEMA, Cayuga County, NY FIS)

Letter of Map Amendment (LOMA): An official revision to a FEMA FIRM done by describing the property affected and amending the FIRM by letter, rather than by physically

changing the map. LOMAs are generally issued when properties have been inadvertently included in the floodplain. (FEMA)

Letter of Map Revision Based on Fill (LOMR-F): Is used to determine the flood risk to a structure or property in situations where fill material (in most cases fill-dirt) has been placed after the first floodplain (FHBM or FIRM) map of the area was established. Like the LOMA process, the LOMR-F uses elevations of the finished property or structure to the elevation of the base flood to determine if the subject of the LOMR-F is at risk of inundation. (FEMA)

Mitigation: Any cost-effective action taken to eliminate or reduce the long-term risk to life and property from natural and technological hazards, including, but not limited to flooding. ([Pennsylvania Emergency Management Agency](#)) Acceptable flood mitigation measures are elevation, floodproofing, relocation, demolition, or any combination thereof. (FEMA)

Special Flood Hazard Area (SFHA): SFHAs are high-risk areas subject to inundation by the base (1-percent-annual-chance) flood; they are also referred to as 1-percent-annual-chance floodplains, base floodplains, or 100-year floodplains. (FEMA)

Stakeholder: An individual or group that has an interest in a decision or proposed action. A stakeholder may have none, one, or more of the following roles: Has authority or decision-making power over some aspect of the project; is affected by the outcome of the project; will be a part of implementing the project; and/or can stop or delay the project (through litigation or other means). A project may have multiple stakeholders, and these stakeholders often have conflicting interests and want competing outcomes. ([U.S. Department of the Interior](#))

Vertical Datum: A vertical datum is a base measurement point (or set of point) from which all elevations of points on the Earth's surface are determined. Without a common datum, surveyors would calculate different elevation values for the same location. Vertical datums are either tidal, that is, based on [sea levels](#), or geodetic, based on the same ellipsoid models of the earth used for computing horizontal datums (FEMA). Common vertical datums used on FIRMs are NGVD29 and NAVD88.

Watershed: A watershed is a basin-like landform defined by highpoints and ridgelines that descend into lower elevations and stream valleys. A watershed carries water from the land after rain falls and snow melts. Drop by drop, water is channeled into soils, ground waters, creeks, and streams, making its way to larger rivers and eventually the sea. (Watershed Atlas)

Water Year: The 12-month period beginning on October 1, for any given year and ending on September 30, of the following year. The water year is designated by the calendar year in which it ends and which includes 9 of the 12 months. Thus, the year ending September 30, 2013 is called the "2013" water year. (USGS)

I. Discovery Overview

The Federal Emergency Management Agency (FEMA) Risk Mapping, Assessment, and Planning, or Risk MAP, program helps communities identify, assess, and reduce their flood risk. Through Risk MAP, FEMA provides information to enhance local mitigation plans, improve community outreach, and increase local resilience to floods.

During Discovery, FEMA:

- Gathers information about local flood risk and flood hazards
- Reviews mitigation plans to understand local mitigation capabilities, hazard risk assessments, and current or future mitigation activities
- Supports communities within the watershed to develop a vision for the watershed's future
- Collects information from communities about their flooding history, development plans, daily operations, and stormwater and floodplain management activities
- Uses all information gathered to determine which areas of the watershed require mapping, risk assessment, or mitigation planning assistance through a Risk MAP project
- Develops Discovery Map and Report that summarize and display the Discovery findings

Great Lakes Coastal Flood Study

FEMA has initiated a coastal analysis restudy for Lake Ontario. The results of the restudy, along with the needs of the communities as identified during the Discovery process, will determine whether updated Digital Flood Insurance Rate Maps (DFIRMs) are produced. The new coastal flood study will update the 1-percent-annual-chance stillwater elevations developed from the comprehensive storm surge study and overland wave analysis of Lake Ontario.

An updated coastal flood study is needed to obtain a better estimate of Lake Ontario's unique coastal flood hazards. The current, effective Flood Insurance Rate Maps (FIRMs) for the surrounding communities are outdated in terms of age and the methodologies used in the coastal analysis to produce them. There have been major changes in National Flood Insurance Program (NFIP) policies and updates to the Guidelines and Specifications used to complete coastal flood studies since the effective date of many of the area's Flood Insurance Studies (FISs). Therefore, an update that will reflect a more detailed and complete hazard determination is needed.

The Great Lakes Coastal Study includes a system-wide solution that provides a comprehensive analysis of past storm events that have occurred within Lake Ontario. The program is funded through the FEMA Risk MAP program. FEMA, the Association of State Floodplain Managers, State partners and FEMA contractors will collaborate in updating the coastal methodology and flood maps as needed. FEMA manages the NFIP, which is the cornerstone of the national strategy for preparing communities for flood-related disasters.

As part of the Great Lakes Coastal Study, the VE zones designate areas that are at higher risk from high velocity wave action and/or wave runoff/overtopping. In such areas significant damage to structures along the coastline can occur. These zones have been mapped nationwide in coastal regions bordering the Atlantic Ocean, Pacific Ocean and Gulf of Mexico. Although it is known that wave periods and wind speeds are generally lower in the Great Lakes when

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compared to the open ocean or Gulf of Mexico, it has been recommended that an independent body evaluate whether the current VE zone criteria are appropriate for the Great Lakes. While the study is ongoing, current RiskMAP projects will continue; however, VE zones will not be designated on NFIP regulatory products until the independent study is complete. The area of moderate wave action, referred to as the Limit of Moderate Wave Action (LiMWA), will still be designated on all regulatory products.

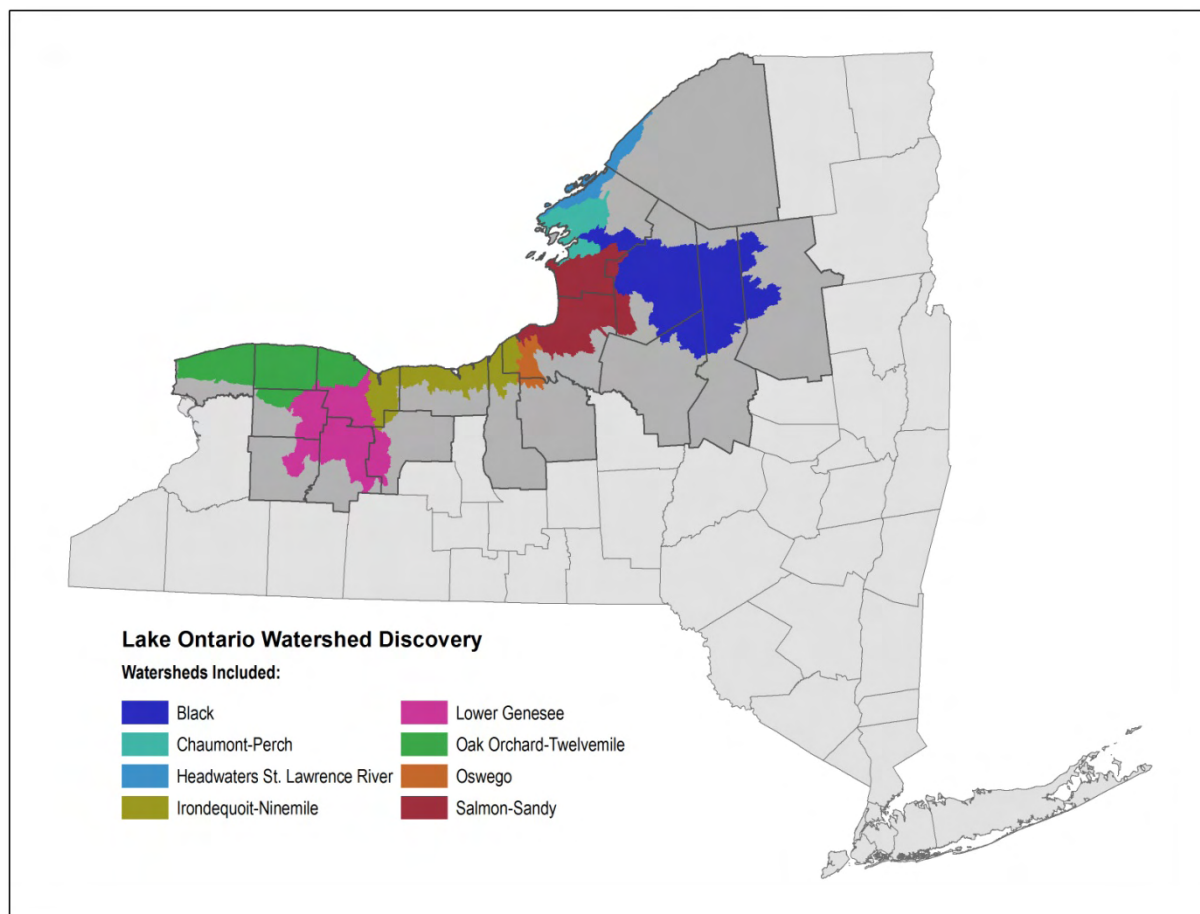


Figure 1: Watersheds Included Within the Lake Ontario Discovery Project

Coastal Barrier Resources System

Coastal barriers are unique land forms that protect distinct aquatic habitats and serve as the mainland's first line of defense against damage from coastal storms and erosion. The Coastal Barrier Resources System (CBRS) defines a coastal barrier as a landform composed of unconsolidated shifting sand or other sedimentary material that is generally long and narrow and entirely or almost entirely surrounded by water. They are sufficiently elevated above normal tides so that they usually have dunes and terrestrial vegetation. To varying degrees, they enclose and thereby protect other features, such as estuaries, salt marshes, and the mainland, from direct wave influence by the open ocean.

There are 157 miles of CBRS boundaries within Lake Ontario. There are areas in the Town of Parma in Monroe County.

Coastal Zone Protection Structures

The U.S. Army Corps of Engineers (USACE) Enterprise Coastal Inventory Database houses information on over 900 coastal structures as well as associated inlet data. The coastal structures protect harbors and shore-based infrastructure, provide shoreline stability control, provide flood protection, and protect coastal communities, roadways and bridges. Coastal structures include seawalls, groins, bulkheads, revetments, dikes, levees, breakwaters, jetties, and piers. The coastal structure data were provided by the USACE, Buffalo District. These data will be added to the Discovery Map.

Purpose of Discovery

The aim of the Oak Orchard-Twelvemile Discovery is to cultivate a strong working relationship between the watershed’s communities and its major environmental, business, and other watershed-based stakeholders to update NFIP products, increase public awareness of short and long-term flood risk, and improve community resiliency related to flood losses (life, property, and business).

Oak Orchard-Twelvemile Discovery Project Products

The result of the project will provide Federal, State, and local officials with three flood risk products to help them understand flood risk and its potential impact on communities and individuals. These products will also enable communities to take proper mitigation actions to reduce this risk. The three products are:

- Discovery Report
- Discovery Maps
- Discovery Data Package

These products will summarize information captured during the Discovery Process. The associated datasets include information pertaining to, but not limited to:

Average Annualized Loss	LiDAR coverage
Community-Identified Areas of Concern	Municipal Separate Storm Sewer Systems
Dams	Repetitive Loss
Demographics	State Pollutant Discharge Systems
Floodplains and floodways	Streams
Letters of Map Change	Stream Gages
Levees and Floodwalls	Streets

II. Lake Ontario Outreach Strategy

Stakeholder Coordination

Pre-Discovery Meetings (via WebEx)

To begin this effort, the [New York State Department of Environmental Conservation](#)'s (NYSDEC) Floodplain Management Section along with Risk Assessment, Mapping, and Planning Partners (a joint venture between Dewberry, URS and ESP) (RAMPP) compiled an extensive list of contact information for community officials within the watershed. In an effort to gather as much feedback from as many public officials and jurisdictions as possible, local officials from individual communities and the counties were invited to the proposed meetings. A list of the community leaders invited to the WebEx sessions is available in Appendix A: *Pre-Discovery Mailing List*. A sample invitation letter is also shown.

The NYSDEC conducted pre-Discovery WebEx sessions with Genesee, Monroe, Niagara, and Orleans County public officials in summer 2013 for the purpose of examining the flood mapping, mitigation, planning, and other needs of communities within the counties comprising the Oak Orchard-Twelvemile Watershed. These meetings were designed as focus groups for community officials engaged in the administration, planning, emergency, and public works duties of local jurisdictions. A record of the meeting participants can be found in Appendix B: *Pre-Discovery Stakeholder Meetings*. While not expressly excluded, the general public does not generally attend these meetings.

The meeting notes are shown in Appendix C: *Kickoff Meeting Notes*. These notes contain comments from those interviewed by NYSDEC and other staff to determine each attending community's flood mapping priorities. The results of these meetings were summarized and forwarded to the FEMA Region II Office and posted to the RAMPP-Team site <https://www.rampp-team.com/ny.htm>.

Other Stakeholders

In addition to municipal officials, planning and emergency agencies, and citizens, there are others stakeholders with an interest in floodplain mapping and management. Major landowners, large employers, academic institutions, environmental, and sporting organizations all have a role to play, and sometimes valuable information to provide, when developing both pre-mapping data and final mapping products.

Who to include in any compilation of watershed stakeholders may be debatable. However, an attempt to identify several relevant stakeholders in the watershed is shown in Appendix D: *Other Stakeholders in the Oak Orchard-Twelvemile Watershed*. It is assumed that this appendix will be added to and amended as needed, if/when further outreach is conducted with the communities during this project and any subsequent mapping efforts within the watershed.

III. Oak Orchard-Twelvemile Watershed Overview

Geography

As described by the U.S. Geological Survey (USGS), the “United States is divided and sub-divided into successively smaller hydrologic units which are classified into four levels: regions, sub-regions, accounting units, and cataloging units. The hydrologic units are arranged within each other, from the smallest (cataloging units) to the largest (regions). Each hydrologic unit is identified by a unique hydrologic unit code (HUC) consisting of two to eight digits based on the four levels of classification in the hydrologic unit system.”

The Oak Orchard-Twelvemile Watershed is located on the northwestern edge of New York State along Lake Ontario. Portions of Genesee, Monroe, Orleans and Niagara Counties lie within the watershed. The watershed occupies 661,707 acres and ranges in elevation from 239 to 948 feet above sea level. The higher elevations are in the southern portion of the watershed.

Urban areas make up 9 percent of the watershed and include Albion, Brockport, Buffalo, Greece, Hamlin, Holley, Lockport, Medina, Newfane and Rochester. Agriculture is evenly spread across the watershed.

Property Ownership

Land ownership in the watershed is diverse. Monroe County is in the northern tier of western New York State, northeast of Buffalo and northwest of Syracuse. The northern county line is also the State line and the border of the United States, marked by Lake Ontario. Monroe County is north of the Finger Lakes.

According to the U.S. Census Bureau, the county has a total area of 1,366 square miles (3,540 km²), of which 659 square miles (1,710 km²) is land and 706 square miles (1,830 km²) (51.72%) is water. According to the U.S. Department of Agriculture (USDA) 2007 Census of Agriculture, there are approximately 585 farms throughout Monroe County, consisting of 133,041 acres of farmland.

There are approximately 1,400 farms in the watershed and most of the operations are small to medium sized. Most of the farm operations are raising livestock with horses, beef cows and milk cows rounding out the top three. Corn for grain then dry hay, or haylage, are the predominant crops, followed by soybeans.

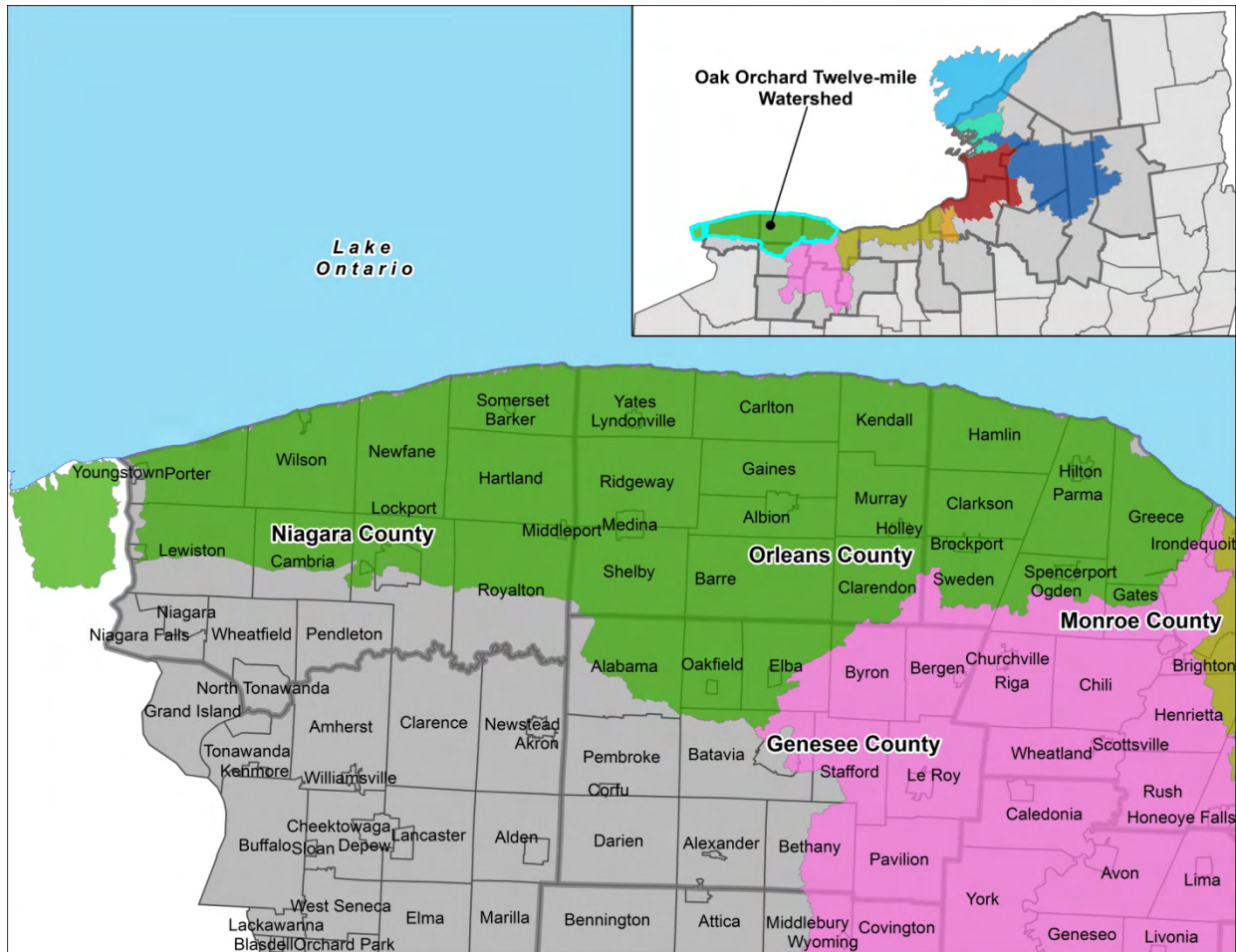


Figure 2: Oak Orchard-Twelve-mile Watershed Communities

Genesee County is in western New York State, south of Lake Ontario, east of Buffalo, and west of Rochester. It borders Orleans County to the north, Monroe and Livingston County to the east, Wyoming County to the south, and Erie County to the west. According to the U.S. Census Bureau, the county has a total area of 492 square miles. According to the USDA 2007 Census of Agriculture, there are approximately 551 farms throughout Genesee County, consisting of 183,539 acres of farmland.

Niagara County is located in western New York State. The county borders Lake Ontario to the north, lies east of Niagara Falls, and west of Rochester. The western border of the county is the international border with Canada. According to the U.S. Census Bureau, the county has a total area of 522 square miles. According to the USDA 2007 Census of Agriculture, there are approximately 554 farms throughout Orleans County, consisting of 139,764 acres of farmland.

Orleans County is located in western New York State. The county borders Lake Ontario to the north, lies east of Buffalo, and west of Rochester. According to the U.S. Census Bureau, the county has a total area of 391 square miles. According to the USDA 2007 Census of Agriculture, there are approximately 859 farms throughout Orleans County, consisting of 198,937 acres of farmland.

More information on property ownership can be found on each county's Real Property webpage as noted in Table 1: *Links to County Real Property Webpages*.

Table 1: Links to County Real Property Webpages

County	Hyperlink to Real Property Webpage
GENESEE	http://www.geneseecounty.oarsystem.com/
MONROE	http://www2.monroecounty.gov/property-index.php
NIAGARA	http://niagaracounty.com/realproperty/Home.aspx
ORLEANS	http://www.orleansny.com/Departments/TaxandFinance/RealProperty.aspx

Demographics

In New York, the Oak Orchard-Twelvemile Watershed covers parts of over 40 cities, towns, and villages. Niagara County is part of the Buffalo-Cheektowaga-Niagara Falls Metropolitan Statistical Area. Genesee County is part of the Batavia Metropolitan Statistical Area. Monroe and Orleans Counties are part of the Rochester Metropolitan Statistical Area. The population distribution in the watershed can be seen in Table 2: *Approximate 2010 Population in the Oak Orchard-Twelvemile Watershed*.

During the in-person meetings several communities noted current and future development pressures near flooding sources.

Table 2: Approximate 2010 Population in the Oak Orchard-Twelvemile Watershed

County	Total County Population (2010 data)	Percent of County Population in Oak Orchard-Twelvemile Watershed	2010 Estimated Population in the Oak Orchard-Twelvemile Watershed (Based on % in watershed * Total Population)	Square Miles in Oak Orchard-Twelvemile Watershed
GENESEE	60,079	11.73	7,048	88.15
MONROE	744,344	21.54	160,320	216.38
NIAGARA	216,469	32.68	70,734	341.83
ORLEANS	42,883	98.86	42,394	388.32
TOTAL	1,063,775	26.37	280,496	1034.68

Land Use

A comprehensive plan is a land-use document providing framework and policy direction for land-use decisions. Comprehensive plans usually include chapters detailing policy direction affecting land use, transportation, housing capital facilities, utilities, and rural areas. Comprehensive plans identify where and how growth needs will be met. For the sake of floodplain management and hazard mitigation, a land-use management plan can be a powerful tool to guide the community to increased resilience.

While many of the communities in the watershed do not have land-use management plans, links to those counties that have developed plans are listed in Table 3. *Links to County Land Use*.

Table 3: Links to County Land Use

County Name	Hyperlink to Land Use Webpage
GENESEE	http://www.co.genesee.ny.us/departments/planning
MONROE	http://www2.monroecounty.gov/planning-planning.php
NIAGARA	http://www.niagaracountybusiness.com/pdp_niagara-county-planning-board.asp
ORLEANS	http://www.orleansny.com/Departments/ResidentServices/Planning.aspx

Table 4: *U.S. Census 2010 and USDA Census of Agriculture 2007* summarizes the total population and land area from the 2010 U.S. Census and the number of farms and acres of farmland from the USDA 2007 Census of Agriculture.

Table 4: U.S. Census 2010 and USDA Census of Agriculture 2007

County	Population	Land Area (Square Miles)	Farm Land (Acres)
GENESEE	60,079	492.94	183,539
MONROE	744,344	657.21	133,041
NIAGARA	216,4695	522.36	142,636
ORLEANS	42,883	391.26	139,764

As was noted during the in-person meetings, growth in the watershed remains subdued for most communities. Construction of new homes and commercial properties does continue at a slow pace. While larger developments may have a greater impact on the watershed, they are often the most heavily scrutinized before and during construction, and therefore are usually the most likely to be compliant with NFIP regulations. In the Oak Orchard-Twelvemile Watershed, two other types of construction may cause greater long-term impact on the watershed's vulnerability to flooding: the incremental conversion of summer cottages to year-round residences, and piecemeal, limited-scale housing developments.

It is important that when issuing building permits for upgrades to these (and all) homes located in the Special Flood Hazard Area (SFHA), local building and code officers know the NFIP's requirements concerning the "substantial improvement" clause. "Substantial improvement" means any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the "start of construction." Comprehensive guidance on building or rebuilding in an SFHA can be found in FEMA's *Substantial Improvement/ Substantial Damage Desk Reference*. A digital copy of this guidance is provided as Attachment 1 of this report.

In addition, the prevalence of smaller developments (often as limited as two building sites) planned across the watershed may be a challenge to effective floodplain management, as these micro-developments can easily slip through regulatory cracks. Local officials need to be aware that minimum NFIP building standards must be met for all construction in the SFHA. The NFIP also has additional reporting (BFE) regulations for those projects involving five lots or 50 acres, whichever is smaller (44 CFR 60.3(b)(3)). Information on the NFIP's building requirements in the SFHA can be found in the NYSDEC's report, *Floodplain Construction Requirements in New York State*. A copy of this brochure can be found online or as Attachment 2 in the digital version of this report.

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IV. Summary of Data Analysis

A large collection of tabular and spatial data was compiled for all communities from Federal, State, and local sources. Community specific information was collected through interactive mapping webinars with stakeholders at the in-person Discovery Meetings.

Table 5: *Data Collected for the Oak Orchard-Twelvemile Watershed* lists the deliverable or product in which the data were included and the respective sources. In addition, the discussion Data Analysis is divided into two sections: a list of the data that can be used for Risk MAP products, and the information that helped the study team to better understand the study area.

In the Lake Ontario Watersheds, the communities within the coastal study area were invited to a Project Kickoff Meeting. During that meeting, community officials were presented with the Risk MAP Discovery concept and asked to participate in the months to come.

Table 5: Data Collected for the Oak Orchard-Twelvemile Watershed

Data Types	Source
Average Annualized Loss Data	Census 2010 and Hazus
Boundaries: Community	FEMA, NYSDEC
Boundaries: County and State	FEMA, NYSDEC
Boundaries: Watersheds	USGS, NYSDEC
Census Blocks	U.S. Census Bureau
Coastal Barrier Resources System	U.S. Fish and Wildlife Service
Contacts	Local websites, State/FEMA updates, NYSDEC
Community Assistance Visits	Community Information System (CIS)
Community Rating System	FEMA's "Community Rating System Communities and Their Classes"
Coordinated Needs Management Strategy	FEMA
Critical Facilities vulnerable to Flooding	Local Mitigation Plans
Dams and/or Levees	USACE, NYSDEC
Declared Disasters	FEMA's "Disaster Declarations Summary"
Demographics, Industry	U.S. Census Bureau, Hazard Mitigation Plans
Effective Floodplains: Modernized SFHAs	FEMA's Mapping Service Center and Mapping Information Platform
Coastal Gage Data	USGS, NOAA CO-OPS
Hazards Mitigation Plans and Status	NYSDEC

Data that can be used for Flood Risk Products

During the Discovery process, a database of available flood hazard and flood risk assessment data was created. This database is an inventory of available data and helps identify and flood hazard data gaps. State, county, and other government Geographic Information System (GIS)

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websites are a good place to start the data search, but local knowledge of flooding and mitigation projects is critical to help accurately determine flood risks and mapping needs. Therefore, locally and regionally developed data are used where available.

Average Annualized Loss Data

The AAL data provide a general understanding of the dollar losses associated with a certain flood event frequency within a county and are used to get a relative comparison of flood risk. It is determined by using FEMA's Multi-Hazard Risk Assessment and Loss Estimation Program, otherwise known as Hazus-MH. The current Hazus-MH analysis is based on approximate flood boundaries and national datasets.

The countywide results for the Oak Orchard-Twelvemile Watershed were obtained from the report called FEMA Hazus AAL Usability Analysis and are shown in Table 6: *HAZUS AAL Data*. AAL data summarized at the census block level are shown in the Discovery Maps. The Oak Orchard-Twelvemile Watershed has a combined estimated AAL of \$2.188 billion in flood related losses.

The highest value losses, by census tract, are located in Monroe County along Buttonwood Creek, Larkin Creek, and Round Pond Creek Reach 1 in the Town of Greece; Lake Ontario shoreline, Brush Creek, and Salmon Creek in the Town of Parma; and Salmon Creek in the Village of Hilton. No AAL Losses for the Town of Gates have been reported for the Lower Genesee Watershed.

Orleans County AAL are spread throughout the municipalities with concentrations along Johnson Creek in the Town of Yates and Village of Lyndonville; and the Lake Ontario shoreline, Oak Orchard Creek in the Towns of Carlton, Ridgeway, Medina, and Shelby.

The upper northeastern portion of the Town of Elba along Oak Orchard Creek accounts for \$12 million of the losses in Genesee County. The remaining AAL are along Oak Orchard Creek in the Towns of Alabama and Oakfield.

Niagara County AAL are concentrated along Johnson Creek in the Town of Hartland; and Eighteen Mile Creek in the Towns of Newfane and Lockport. The Towns of Porter and Wilson are estimated to experience losses along Twelve-mile and Four-mile creeks.

Table 6: HAZUS AAL Data (in Thousands of Dollars)

County	Community	Total Building Loss (\$K)	Total Contents Loss (\$K)	Total Total Loss (\$K)
GENESEE	ALABAMA, TOWN OF	\$4,000	\$8,000	\$12,000
	ELBA, TOWN OF	\$2,000	\$7,000	\$12,000
	VILLAGE OF ELBA	\$0	\$0	\$0
	OAKFIELD, TOWN OF	\$6,000	\$3,000	\$9,000
	OAKFIELD, VILLAGE OF			
MONROE	HAMLIN, TOWN OF	\$75,000	\$75,000	\$151,000
	PARMA, TOWN OF	\$141,000	\$132,000	\$275,000
	BROCKPORT, VILLAGE OF	\$0	\$0	\$0
	CLARKSON, TOWN OF	\$22,000	\$23,000	\$46,000

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County	Community	Total Building Loss (\$K)	Total Contents Loss (\$K)	Total Total Loss (\$K)
MONROE (CON'T)	GATES, TOWN OF	\$0	\$0	\$0
	GREECE, TOWN OF	\$583,000	\$698,000	\$1,308,000
	HILTON, VILLAGE OF	\$134,000	\$138,000	\$276,000
	OGDEN, TOWN OF	\$34,000	\$67,000	\$103,000
	SPENCERPORT, VILLAGE OF	\$0	\$0	\$0
	SWEDEN, TOWN OF	\$7,000	\$4,000	\$11,000
NIAGARA	NEWFANE, TOWN OF	\$25,000	\$18,000	\$43,000
	PORTER, TOWN OF	\$13,000	\$11,000	\$24,000
	SOMERSET, TOWN OF	\$0	\$1,000	\$2,000
	WILSON, TOWN OF			
	WILSON, VILLAGE OF	\$12,000	\$7,000	\$19,000
	BARKER, VILLAGE OF	\$0	\$1,000	\$2,000
	CAMBRIA, TOWN OF	\$1,000	\$2,000	\$3,000
	HARTLAND, TOWN OF	\$8,000	\$5,000	\$13,000
	LEWISTON, TOWN OF	\$0	\$0	\$0
	LEWISTON, VILLAGE OF	\$0	\$0	\$0
	LOCKPORT, CITY OF			
	LOCKPORT, TOWN OF	\$9,000	\$13,000	\$24,000
	MIDDLEPORT, VILLAGE OF	\$7,000	\$21,000	\$30,000
	ROYALTON, TOWN OF	\$1,000	\$0	\$1,000
	YOUNGSTOWN, VILLAGE OF	\$0	\$0	\$0
ORLEANS	CARLTON, TOWN OF	\$8,000	\$7,000	\$15,000
	KENDALL, TOWN OF	\$28,000	\$19,000	\$47,000
	YATES, TOWN OF	\$12,000	\$11,000	\$24,000
	ALBION, TOWN OF			
	ALBION, VILLAGE OF	\$0	\$4,000	\$4,000
	BARRE, TOWN	\$2,000	\$7,000	\$12,000
	CLARENDON, TOWN OF	\$2,000	\$7,000	\$12,000
	GAINES, TOWN OF	\$1,000	\$0	\$1,000
	HOLLEY, VILLAGE OF	\$1,000	\$1,000	\$2,000
	LYNDONVILLE, VILLAGE OF	\$6,000	\$7,000	\$14,000
	MEDINA, VILLAGE OF	\$0	\$0	\$0
	MURRAY, TOWN OF	\$6,000	\$4,000	\$10,000
	RIDGEWAY, TOWN OF	\$9,000	\$9,000	\$18,000
	SHELBY, TOWN OF	\$5,000	\$8,000	\$13,000

Source: FEMA HAZUS AAL Usability Analysis 2012

Gage Data

Stream Gages

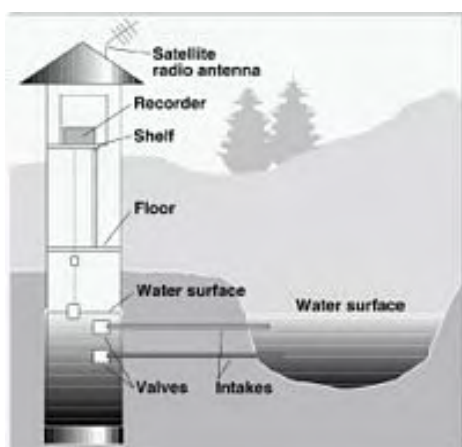


Figure 3: Typical Modern USGS Stream Gage

There are three known current and past gages in the watershed. Two are currently active and being monitored by the USGS and the NYSDEC.

According to the USGS, most USGS stream gages operate by measuring the elevation of the water in the river or stream and then converting the water elevation (called “stage”) to a stream flow (“discharge”) by using a curve that relates the elevation to a set of actual discharge measurements. This is done because current technology cannot accurately measure the direct flow of water.

The USGS standard is to measure river stage to 0.01 inches. This is accomplished by the use of floats inside a stilling well, by the use of pressure transducers that measure how much pressure is required to push a gas

bubble through a tube (related to the depth of water), or with radar. Figure 3: *Typical Modern USGS Stream Gage* illustrates the design of a river gaging station.

At most USGS stream gages, the stage is measured every 15 minutes and the data are stored in an electronic data recorder, most often powered by solar energy. At set intervals, usually between every 1 to 4 hours, the data are transmitted to the USGS using satellite, phone, or radio. At the USGS offices, the curves relating stage to stream flow are applied to determine stream flow estimates and both the stage and stream flow data are then displayed on the USGS website.

For more information on how stream gages work, please see the USGS’s factsheet on stream gaging at <http://pubs.usgs.gov/fs/2005/3131/>. Figure 4: *Oak Orchard-Twelvemile Watershed* illustrates the river gaging stations.

Table 7: *USGS Gages in the Oak Orchard-Twelvemile Watershed*, shows the gage identification number, location, drainage area, status, and county for all USGS gages identified in the Oak Orchard-Twelvemile Watershed. Historical stream flow information from the USGS gages listed in Table 7 will be employed for use in hydrological analysis where applicable. Additional information on gages in the watershed may be found by visiting the USGS website at: <http://waterdata.usgs.gov/nwis/nwisman>

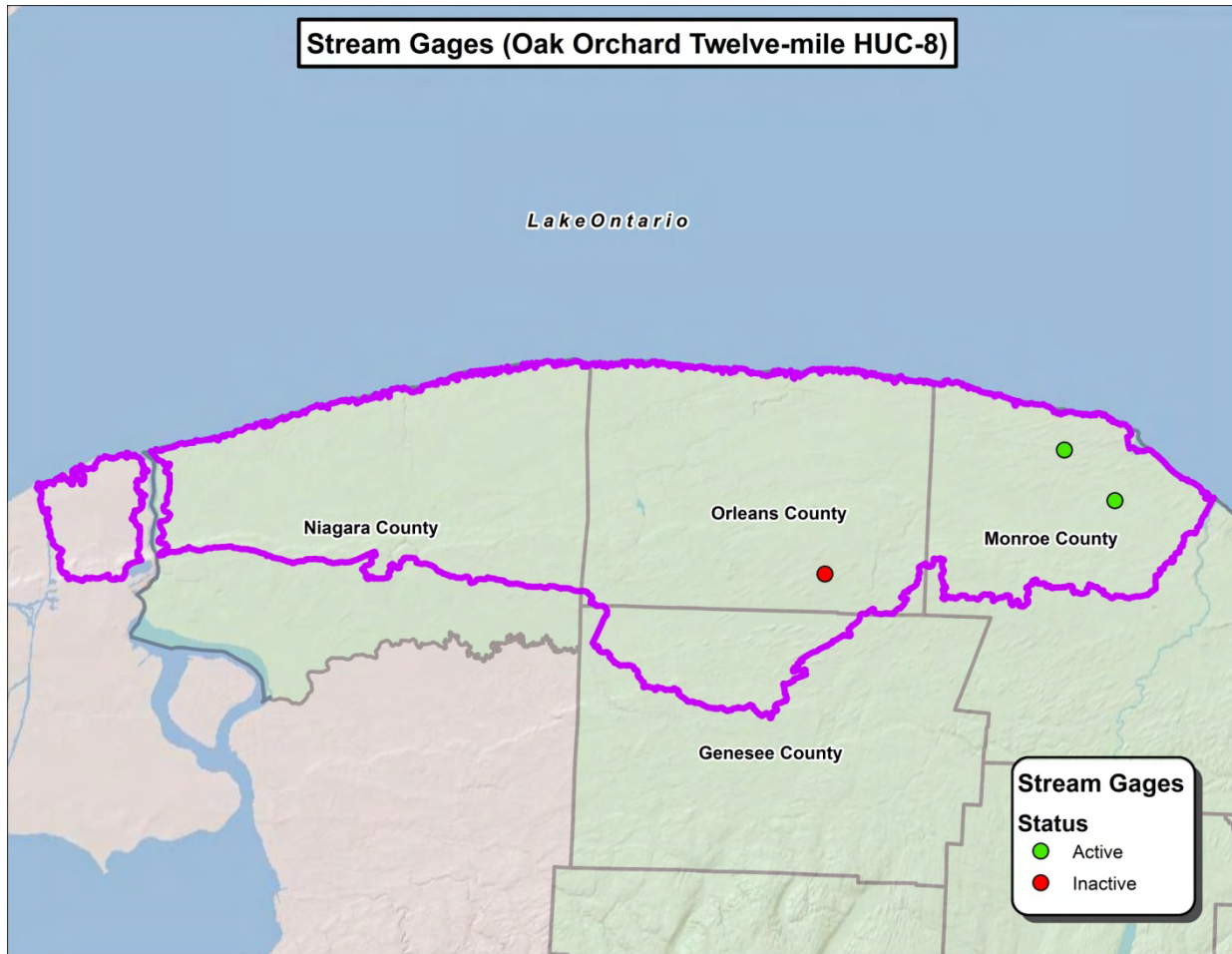


Figure 4: Oak Orchard-Twelvemile Watershed Stream Gages

Table 7: USGS Gages in the Oak Orchard-Twelvemile Watershed

Gage ID	Gage Location	Drainage Area (sq. miles)	Gage Status	County
04219940	Manning Muckland Creek Near Barre Center NY	5.8	Inactive	Orleans
0422026250	Northrup Creek at North Greece NY	10.1	Active	Monroe
04220250	West Creek Near Hilton NY	31	Active	Monroe

Rain Gages

The National Oceanic and Atmospheric Administration’s (NOAA) Cooperative Observer Program is a weather and climate observing network of more than 11,000 volunteers who take observations nationwide on farms, in urban and suburban areas, National Parks, seashores, and mountaintops. Within the four counties of the Oak Orchard-Twelvemile Watershed, two locations are currently active. When appropriate, FEMA will utilize the NOAA information

from these gages in developing meteorological models for the watershed that will employ rainfall runoff models and calibration.

Additional information on rainfall in New York can be found in [Technical Paper No. 49](#) and in the Technical Memorandum [NWS HYDRO-35](#), both on NOAA's website.

Water Level Gages

National Oceanic and Atmospheric Administration's (NOAA) National Ocean Service (NOS) is responsible for recording and disseminating water level data. Table 8: *Tidal Gage Stations* shows the water level station identification number and location for the gage in the Oak Orchard-Twelvemile Watershed. It should be noted that no stations within the Great Lakes provide tidal information, as the tidal range is minimal.

Table 8: Tidal Gage Stations

County	Begin Date	End Date	Gage Location
NIAGARA	January 1, 1967		Town of Newfane

Wave Gage/Buoy Stations

The National Data Buoy Center (NDBC) is part of the NOAA National Weather Service (NWS). The NDBC operates and maintains a large network of data collecting stations. The NDBC provides hourly data, including wind speed, direction, and gust; atmospheric pressure; and air temperature. Table 9: *Buoy Stations* shows the location of the stations in the Oak Orchard-Twelvemile Watershed. Historical and current data are available at NDBC website.

Table 9: Buoy Stations

County	Gage Location
MONROE	RCRN6 Rochester 43.269N 77.626W
NIAGARA	OLCN6 Burt 43.341N 78.19W
NIAGARA	YGNN6 Niagara on the Lake 43.262N 79.064W

Levees

A levee or floodwall is defined in the Title 44 of the Code of Federal Regulations (CFR), Section 59.1 as "a man-made structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control, or divert the flow of water so as to provide protection from temporary flooding". Levee certification and or accreditation information can be found in Attachment 3: *Levee Certification vs Accreditation*.

A review of current and preliminary FIRMs finds that there are no identified levees in the study area.

Dams

According to the [NYSDEC's Dam Safety Section](#)'s dam inventory, the Oak Orchard-Twelvemile Watershed contains 71 dam structures. NYSDEC uses a classification scale of A-D and 0 (zero) to assign hazard potential to each of the dam structures contained within the inventory. The locations of dams in the watershed are shown on the Figure 5: *Dams in Oak Orchard-Twelvemile Watershed*.

The NYSDEC classifies dams in the State using the following criteria:

Class A-Low Hazard Potential: Resulting damages from a dam failure would likely be minimal and not interfere with any critical infrastructure; personal injury and substantial economic loss is unlikely to occur.

Class B-Intermediate Hazard Potential: A dam failure may result in damage to isolated homes, roads and railways; critical facilities may experience disruption; personal injury or substantial economic loss is likely, but loss of human life is not expected.

Class C-High Hazard Potential: Dam failure may result in widespread or serious damage to homes; damage to roads, railroads, commercial buildings and critical infrastructure is expected; loss of human life and substantial economic loss is expected.

Class D-Negligible or No Hazard Potential: Dam has been breached, removed or otherwise has failed or no longer materially impounds waters, or the dam was planned, but never constructed at this location. Class D dams are considered to be defunct dams posing negligible or no hazard.

Class 0-Unclassified Hazard Potential: Hazard code has not yet been assigned.

Table 10: *Dams in the Oak Orchard-Twelvemile Watershed* shows the classification of dams located in the Oak Orchard-Twelvemile Watershed study area. According to the NYSDEC's Dam Safety Section's dam files, many of the Class B and C dams have reports and studies available. Information includes inspection and certification dates, site plans, analysis (H&H), As-Built drawings, Emergency Action Plans (EAPs), applications and permits for maintenance, and correspondence related to each dam.

Table 10: Dams in the Oak Orchard-Twelvemile Watershed

County	Class A	Class B	Class C	Class D	Total
GENESEE	13	1	0	2	16
MONROE	3	1	3	2	10
NIAGARA	3	3	1	13	20
ORLEANS	8	6	2	9	25
TOTAL	27	11	6	26	71

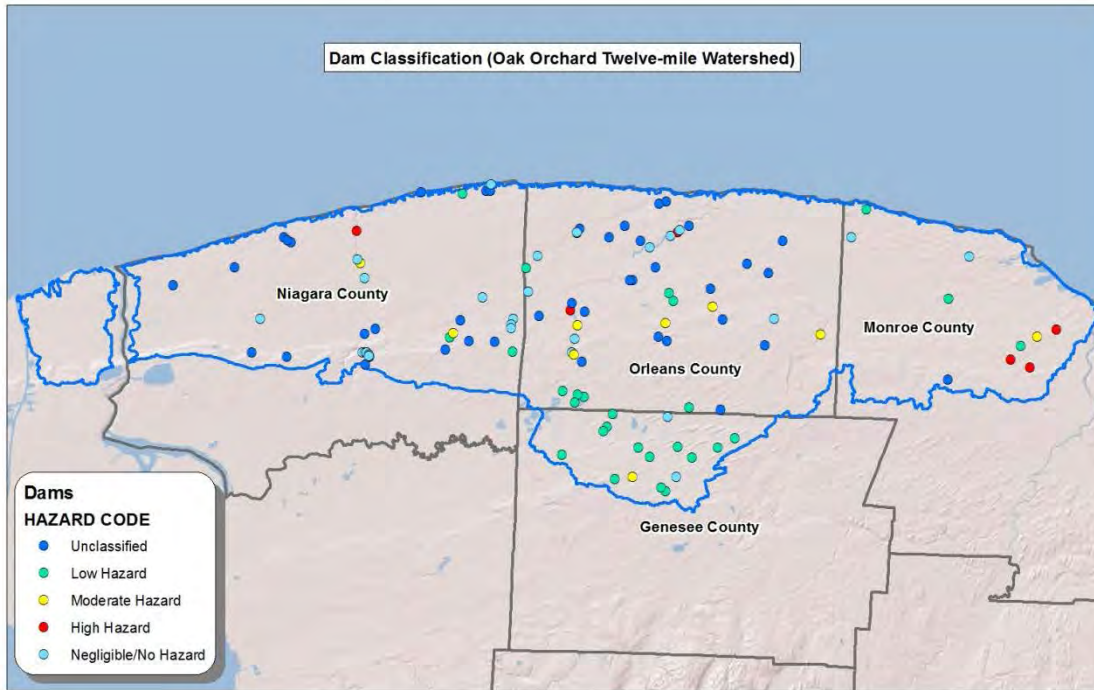


Figure 5: Dams in the Oak Orchard-Twelvemile Watershed

Watershed Boundaries

The Oak Orchard-Twelvemile Watershed is a HUC8 watershed. Figure 6 shows the boundaries of the Oak Orchard-Twelvemile Watershed. In decreasing area (increasing number of digits in the HUC) order, each is made up by several contiguous watersheds of lower hierarchy. The first two digits of the HUC are the code for the Regional Boundary (e.g., 04, for the Great Lakes Region). The next two digits of the HUC are the code for the Subregional Boundary (e.g., 0413, Southeastern Lake Ontario). The next two digits are the code for the Accounting Unit (e.g., 041300, Oak Orchard Twelve-mile River Basin, New York). The next two digits of the HUC are the Cataloging Unit (e.g., 04130001, Oak Orchard-Twelvemile). Table 11: *Oak Orchard-Twelvemile Watershed* lists the HUC-8 code and the watershed name.

Table 11: Oak Orchard Twelve-mile Watershed

HUC 8 Code	Name
04130001	Oak Orchard-Twelvemile

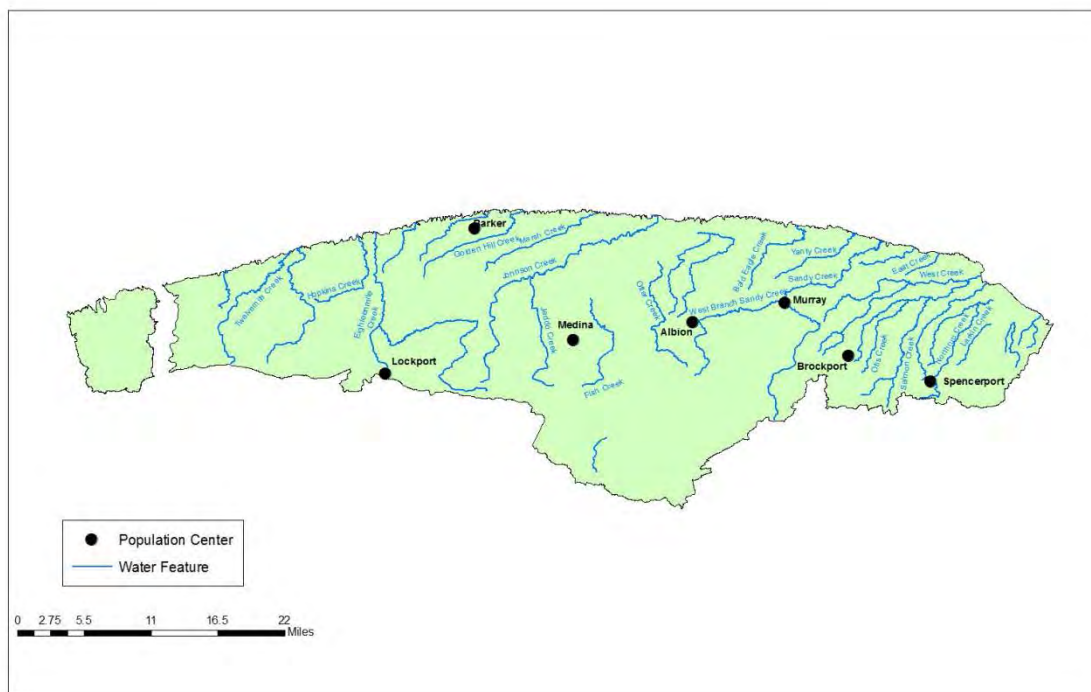


Figure 6: Oak Orchard-Twelve Mile Watershed

Bathymetry

Bathymetry is the study of the underwater depth of lake or [ocean floors](#). In other words, bathymetry is the underwater equivalent to [hypsometry](#) or topography; it usually shows seafloor relief or [terrain](#) as [contour lines](#). The data used to make bathymetric maps today typically comes from an echosounder ([sonar](#)) mounted beneath or over the side of a boat, "pinging" a beam of sound downward at the seafloor, or from remote sensing systems

For the topography, FEMA will use data flown by the USACE on June 6 – Sept 23, 2011. The data has a 500-meter inland buffer from the shoreline along the lake, and also has bathymetric data in the collection. The data has a 2-meter point spacing with a 0.75-meter horizontal accuracy and a 20-centimeter root-mean-square error.

Jurisdictional Boundaries

Jurisdictional boundaries were obtained from NYSDEC. During the Discovery Meetings, many communities noted changes to their jurisdictional boundaries. This information has been catalogued in FEMA's Coordinated Needs Management Strategy (CNMS). Boundary changes were noted for:

- Town of Lyndonville (Orleans County)
- Village of Albion (Orleans County)
- Village of Brockport (Monroe County)
- Town of Parma (Monroe County)

Shoreline Change Information

The Oak Orchard-Twelvemile Watershed study area has approximately 106 miles of shoreline along Lake Ontario, contained within Niagara, Orleans, and Monroe Counties. Portions of the shoreline may be vulnerable to coastal erosion through natural actions and human intervention. Erosion is the loss of land near the coastline due to water movement from exposure to wave action, currents, tides, wind driven water, ice or other storm impacts. The coastline of Lake Ontario is at risk to coastal erosion from natural and human activities and is regulated. These areas are currently mapped as coastal erosion hazard areas (CEHAs) and require a CEHA permit (Article 34 Part 505) for any regulated activity.

See <http://www.dec.ny.gov/lands/28923.html>.

In addition, runoff of surface water or groundwater seepage could cause erosion. During the Discovery Meetings, the Town of Porter in Niagara County noted significant erosion along the Lake Ontario shoreline and Niagara River and east to Fourmile Creek.

Streamlines/Hydrograph

Stream lines, when available, were obtained from the effective FIRM databases issued for the communities. Streamlines are a trace made over a period of time that is tangent to the direction of velocity. By definition, a hydrograph is a plot of the variation of discharge with respect to time. Discharge is the volume of water flowing past a location per unit time (usually in cubic feet per second (cfs)). These two components are important for location of floods, forecasting floods, and severity of floods, and enable communities to be able to plan, mitigate and prevent loss of life and property. These two components are important for location of floods, forecasting floods, and severity of floods, and enable communities to be able to plan, mitigate and prevent loss of life and property. For more information please visit the NOAA website: http://www.nws.noaa.gov/os/hod/SHManual/SHMan017_hydrograph.htm

Topography

Topography is the description of such surface shapes and features. The topography of an area could also refer to the surface shapes and features. The topographic data will be generated from the LiDAR that has been collected to obtain elevation information. More information on LiDAR is available at <http://oceanservice.noaa.gov/facts/lidar.html>. LiDAR elevation data were only available for some portions of the project area (a project is ongoing to obtain the remainder of the data). The link below shows the coverage of LiDAR data that was available as of April 25, 2013. <http://gis.ny.gov/elevation/lidar-coverage.htm>

Transportation

Transportation is the movement of people and goods from location to location. These features include roads, rail, and air. Planning for these features allows for utilization and function within communities and interaction with other communities. They are the backbone of economics and diversity. Transportation features were obtained from the applicable FIRM databases and supplemented with data from communities and the New York State GIS Clearinghouse.

Other Data and Information

Biennial Report

Every 2 years FEMA collects data from communities participating in the NFIP through the Biennial Report process. This provides communities an opportunity to identify floodplain mapping needs and request assistance in implementing a floodplain management program. The Biennial Report provides FEMA information on a community's floodplain management program and any changes in its SFHAs, which assists FEMA to evaluate the effectiveness of a community's floodplain management activities. The Biennial Report shows FEMA nationwide trends and patterns, which FEMA uses to help guide improvements to the NFIP. A FEMA fact sheet explaining the Biennial Report can be found at FEMA's webpage on the topic or by referring to Attachment 4: *Biennial Report*, of this report.

Regulatory Mapping

As noted above, the Oak Orchard-Twelvemile Watershed covers portions of four New York counties. The mapping in place is a mix of recently revised and older FIRMs.

Genesee County communities do not have a countywide FIRM. All communities in the county have community-based FIRMs, with map dates ranging from 1981 to 1988. A countywide FIRM was released in Monroe County on August 28, 2008. This countywide FIRM includes some of the communities in the Oak Orchard-Twelvemile Watershed. Orleans County communities do not have a countywide FIRM.

The effective FIRM for each of the participating communities is shown in Table 12: *FIRM Effective Dates*. Flood insurance is not available in communities that do not participate in the NFIP.

Table 12: FIRM Effective Dates

County	Coastal	Community	FIRM Effective Date	Notes
GENESEE	NO	ALABAMA, TOWN OF	11/18/1983	No Notes
		ELBA, TOWN OF	6/4/1976	
		VILLAGE OF ELBA	1/20/1984	
		OAKFIELD, TOWN OF	5/25/1984	
		OAKFIELD, VILLAGE OF	3/23/1984	
MONROE	YES	HAMLIN, TOWN OF	8/28/2008	Effective Countywide 8/28/2008
		GREECE, TOWN OF	8/28/2008	
		PARMA, TOWN OF	8/28/2008	
	NO	BROCKPORT, VILLAGE OF	8/28/2008	
		CLARKSON, TOWN OF	8/28/2008	
		GATES, TOWN OF	8/28/2008	
		GREECE, TOWN OF	8/28/2008	
		HILTON, VILLAGE OF	8/28/2008	
		OGDEN, TOWN OF	8/28/2008	
		SPENCERPORT, VILLAGE OF	8/28/2008	
		SWEDEN, TOWN OF	8/28/2008	

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County	Coastal	Community	FIRM Effective Date	Notes
NIAGARA	YES	NEWFANE, TOWN OF	9/17/2010	Effective Countywide 9/17/2010
		PORTER, TOWN OF	9/17/2010	
		SOMERSET, TOWN OF	9/17/2010	
		WILSON, TOWN OF	9/17/2010	
		WILSON, VILLAGE OF	9/17/2010	
	NO	BARKER, VILLAGE OF	9/17/2010	
		CAMBRIA, TOWN OF	9/17/2010	
		HARTLAND, TOWN OF	9/17/2010	
		LEWISTON, TOWN OF	9/17/2010	
		LEWISTON, VILLAGE OF	9/17/2010	
		LOCKPORT, CITY OF	9/17/2010	
		LOCKPORT, TOWN OF	9/17/2010	
		MIDDLEPORT, VILLAGE OF	9/17/2010	
		ROYALTON, TOWN OF	9/17/2010	
		YOUNGSTOWN, VILLAGE OF	9/17/2010	
ORLEANS	YES	CARLTON, TOWN OF	11/1/1978	No Notes
		KENDALL, TOWN OF	5/1/1978	
		YATES, TOWN OF	9/29/1978	
	NO	ALBION, TOWN OF	8/8/1980	
		ALBION, VILLAGE OF	11/30/1979	
		BARRE, TOWN	10/15/1981	
		CLARENDON, TOWN OF	1/31/1983	
		GAINES, TOWN OF	6/8/1984	
		HOLLEY, VILLAGE OF	11/30/1979	
		LYNDONVILLE, VILLAGE OF	9/16/1981	
		MEDINA, VILLAGE OF	3/28/1980	
		MURRAY, TOWN OF	3/21/1980	
		RIDGEWAY, TOWN OF	9/14/1979	
		SHELBY, TOWN OF	12/22/1983	

*Participating without FIRMs

**Non-Participating without FIRMs

Ordinances

The Project Area's local jurisdictions have a patchwork of regulations regarding development within known SFHAs, ranging from ordinances with minimum NFIP requirements to strong, pro-active ordinances that not only regulate and protect new and improved development in existing SFHAs, but seek to mitigate the growth of SFHAs caused by increased runoff from developed areas and the degradation of natural flood control areas, such as wetlands and forests. The NIFP uses six different ordinance levels (60.3 land-use classification levels).

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The following summarizes the three different ordinance levels NYS uses, and which will be located in the local law for the community.

1. The “a” type should be used when 1-percent-annual-chance floodplains have not yet been identified.
2. The “d” type should be used when: 1-percent-annual-chance floodplains without Base Flood Elevations (BFEs) have been identified; 1-percent-annual-chance floodplains with BFEs, but without floodways have been identified; and 1-percent-annual-chance floodplains with BFEs and a floodway have been identified. If the community also has coastal flooding, but does not have coastal high-hazard areas (V Zones), it is a “d” type.
3. The “e” type should be used when: coastal high-hazard areas (V Zones) have been identified.

Table 13: *Program Status and Ordinance Level* lists the Program Status and Ordinance Level for each community.

Table 13: Program Status and Ordinance Level

County	Community	Program Status	Ordinance Level
GENESEE	ALABAMA, TOWN OF	Regular	D
	ELBA, TOWN OF	Regular	D
	ELBA, VILLAGE OF	Regular	D
	OAKFIELD, TOWN OF	Regular	D
	OAKFIELD, VILLAGE OF	Regular	D
MONROE	BROCKPORT, VILLAGE OF	Regular	D
	CLARKSON, TOWN OF	Regular	D
	GATES, TOWN OF	Regular	D
	GREECE, TOWN OF	Regular	D
	HAMLIN, TOWN OF	Regular	D
	HILTON, VILLAGE OF	Regular	D
	OGDEN, TOWN OF	Regular	D
	PARMA, TOWN OF	Regular	D
	SPENCERPORT, VILLAGE OF	Regular	D
NIAGARA	SWEDEN, TOWN OF	Regular	D
	BARKER, VILLAGE OF	Regular	D
	CAMBRIA, TOWN OF	Regular	D
	HARTLAND, TOWN OF	Regular	D
	LEWISTON, TOWN OF	Regular	D
	LEWISTON, VILLAGE OF	Regular	D
	LOCKPORT, CITY OF	Regular	D
	LOCKPORT, TOWN OF	Regular	D
	MIDDLEPORT, VILLAGE OF	Regular	D
	NEWFANE, TOWN OF	Regular	D
	PORTER, TOWN OF	Regular	D
	ROYALTON, TOWN OF	Regular	D
	SOMERSET, TOWN OF	Regular	D
	WILSON, TOWN OF	Regular	D
	WILSON, VILLAGE OF	Regular	D
	YOUNGSTOWN, VILLAGE OF	Regular	D

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County	Community	Program Status	Ordinance Level
ORLEANS	ALBION, TOWN OF	Regular	D
	ALBION, VILLAGE OF	Regular	D
	BARRE, TOWN	Regular	D
	CARLTON, TOWN OF	Regular	D
	CLARENDON, TOWN OF	Regular	D
	GAINES, TOWN OF	Regular	D
	HOLLEY, VILLAGE OF	Regular	D
	KENDALL, TOWN OF	Regular	D
	LYNDONVILLE, VILLAGE OF	Regular	D
	MEDINA, VILLAGE OF	Regular	D
	MURRAY, TOWN OF	Regular	D
	RIDGEWAY, TOWN OF	Regular	D
	SHELBY, TOWN OF	Regular	D
	YATES, TOWN OF	Regular	D

It is assumed that the NFIP-participating communities within the Project Area have floodplain management regulations in place and have a mechanism for updating their ordinances.

Flood Insurance Policies

A community's agreement to adopt and enforce floodplain management ordinances as part of the NFIP, particularly with respect to new construction, is an important element in making federally-backed flood insurance available to home and business owners. For this Discovery project, data on flood insurance policies in the watershed communities were gathered.

This Discovery project also gathered data regarding the NFIP flood insurance policies in the watershed. As of August 31, 2013, 1,299 policies were in-force accounting for \$66,249,400 in Insurance Coverage and \$353,637 in written premiums for the communities within the study area. The number of policies, total coverage, and total premium cost are listed in Table 14: *Flood Insurance Policy and Claims Data*.

Monroe County represents nearly 70 percent of the insurance policies (898), insurance coverage (\$150.8 million), and written premium in-force (\$858,472) within the Oak Orchard-Twelvemile Watershed. Within Monroe County, the Town of Gates has 384 policies and the Town of Greece has 224 policies totaling \$99.25 million in insurance coverage. It should be noted that the Village of Brockport has three policies with a total of \$841,000 in insurance coverage, and the Village of Spencerport has nine policies with \$2,482,800 insurance in-force, representing the highest average insurance policy value for the county.

Niagara County represents 22 percent of the flood policies within the study area, with 280 policies, \$48 million in coverage, and \$266,862 for written premiums. The City of Lockport currently has 58 policies accounting for \$11.1 million in coverage, followed by the Town of Lockport with 49 policies and \$8.2 million in coverage. The Village of Wilson and Town of Hartland have the highest coverage amount per policy with \$300,000 average policy coverage and \$249,767, respectively.

Genesee County has seven policies in-force, accounting for \$645,900 in coverage and \$6,008 in written premiums.

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Orleans County has 114 policies, \$14.7 million in coverage, and \$86,038 in total written premiums. One-third of the county's policies are located within the Town of Carlton, with \$4.29 million in coverage. The Towns of Gaines and Kendall have the highest average coverage per policy in the county.

Table 14: Flood Insurance Policy and Claims Data (as of 8/31/2013)

County	Community	Number of Policies	Insurance In-force whole \$	Written Premium In-force	Number of Losses	Total Losses Paid
GENESEE	ALABAMA, TOWN OF	N/A	N/A	N/A	1	\$ 0
	ELBA, TOWN OF	3	\$201,500	\$1,715	0	\$ 0
	VILLAGE OF ELBA	1	\$140,000	\$344	0	\$ 0
	OAKFIELD, TOWN OF	3	\$304,400	\$3,949	1	\$ 0
	OAKFIELD, VILLAGE OF	N/A	N/A	N/A	N/A	N/A
MONROE	BROCKPORT, VILLAGE OF	3	\$841,000	\$2,367	1	\$ 1,238
	CLARKSON, TOWN OF	10	\$2,106,400	\$7,539	7	\$ 9,711
	GATES, TOWN OF	384	\$54,216,100	\$417,570	38	\$ 49,341
	GREECE, TOWN OF	224	\$45,034,400	\$166,927	103	\$ 365,565
	HAMLIN, TOWN OF	93	\$15,940,300	\$85,116	32	\$ 100,160
	HILTON, VILLAGE OF	27	\$5,262,800	\$25,365	16	\$ 435,823
	OGDEN, TOWN OF	32	\$6,881,000	\$33,405	8	\$ 152,841
	PARMA, TOWN OF	109	\$16,692,600	\$104,967	17	\$ 46,158
	SPENCERPORT, VILLAGE OF	9	\$2,482,800	\$10,180	15	\$ 161,551
	SWEDEN, TOWN OF	7	\$1,350,400	\$5,036	3	\$ 1,515
NIAGARA	BARKER, VILLAGE OF	9	\$1,296,000	\$5,233	\$ 1,047,900	5
	CAMBRIA, TOWN OF	13	\$2,114,900	\$7,778	\$ 1,949,900	11
	HARTLAND, TOWN OF	3	\$749,300	\$4,691	\$ 657,200	0
	LEWISTON, TOWN OF	9	\$1,672,400	\$9,376	\$ 1,672,400	1
	LEWISTON, VILLAGE OF	2	\$700,000	\$891	\$ 910,000	2
	LOCKPORT, CITY OF	58	\$11,100,200	\$95,168	\$ 10,844,200	9
	LOCKPORT, TOWN OF	49	\$8,267,200	\$40,965	\$ 8,090,100	7
	MIDDLEPORT, VILLAGE OF	29	\$3,481,000	\$23,977	\$ 3,404,700	1
	NEWFANE, TOWN OF	18	\$2,353,100	\$12,797	\$ 2,723,100	3
	PORTER, TOWN OF	25	\$5,348,400	\$23,754	2	\$ 544

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County	Community	Number of Policies	Insurance In-force whole \$	Written Premium In-force	Number of Losses	Total Losses Paid
NIAGARA (CONT'D)	ROYALTON, TOWN OF	21	\$4,132,200	\$9,251	12	\$ 46,700
	SOMERSET, TOWN OF	9	\$1,313,400	\$5,816	1	\$ 446
	WILSON, TOWN OF	32	\$4,850,400	\$24,225	1	\$ 0
	WILSON, VILLAGE OF	2	\$600,000	\$2,781	1	\$ 53,553
	YOUNGSTOWN, VILLAGE OF	1	\$28,000	\$159	0	\$ 0
ORLEANS	ALBION, TOWN OF	2	\$357,500	\$582	0	\$ 0
	ALBION, VILLAGE OF	5	\$667,000	\$2,900	1	\$ 1,973
	BARRE, TOWN	9	\$1,290,000	\$11,018	1	\$ 2,797
	CARLTON, TOWN OF	32	\$4,293,500	\$26,387	9	\$ 15,310
	CLARENDON, TOWN OF	N/A	N/A	N/A	8	\$ 30,493
	GAINES, TOWN OF	2	\$370,900	\$669	0	\$ 0
	HOLLEY, VILLAGE OF	1	\$42,000	\$191	1	\$ 0
	KENDALL, TOWN OF	17	\$3,154,700	\$13,223	8	\$ 17,081
	LYNDONVILLE, VILLAGE OF	19	\$1,283,000	\$12,174	2	\$ 0
	MEDINA, VILLAGE OF	4	\$239,300	\$2,643	3	\$ 1,757
	MURRAY, TOWN OF	N/A	N/A	N/A	N/A	N/A
	RIDGEWAY, TOWN OF	8	\$1,047,000	\$4,360	0	\$ 0
	SHELBY, TOWN OF	2	\$455,000	\$1,567	0	\$ 0
	YATES, TOWN OF	13	\$1,544,200	\$10,324	4	\$ 6,995

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Letters of Map Change (LOMC)

Due to limitations in the scale or topographic detail of the source maps used to prepare a FIRM, on occasion, small areas of elevated land may be included in a SFHA. When a property owner feels that this has occurred, they may request a Letter of Map Change (LOMC) for their property or structure.

A LOMC is the general term for a suite of methods FEMA uses to make an official flood hazard determination for a structure or property. The Letter of Map Amendment (LOMA), for properties on natural high ground and the Letter of Map Revision based on Fill (LOMR-F), for properties elevated by the placement of fill, processes are the most common ways used by property owners to amend the FIRM. It is important to note that these methods do not physically change the FIRM for a community; rather they amend, *by letter*, the FIRM for the benefit of accurate site information without the cost of publishing a revised FIRM panel. By comparison, a Letter of Map Revision (LOMR) is commonly used by community officials to request FIRM changes stemming from completed development, flood-control projects, or other larger-scale changes.

Table 15: *LOMCs in the Project Area* and Figure 7 highlight the areas within the Oak Orchard-Twelvemile Watershed that have LOMCs; there are 220 LOMAs/LOMR-F and no LOMRs located in the Oak Orchard-Twelvemile Watershed. Niagara County has 41 of the LOMCs, of which 12 are within the Town of Wilson. Genesee County has 3 LOMAs/LOMR-F, all located within the Town of Elba. Monroe County has 166 LOMCs; the Town of Greece has 61 LOMA/LOMR-Fs, followed by the Town of Gates with 57. Orleans County has 10 LOMCs, of which 3 are from the Town of Carlton.

More information on the LOMA and LOMR-F processes can be found on FEMA's [LOMC web site](#) or in hard copy by reviewing Attachment 5 - *LOMA-LOMR-F Fact Sheet*, included with the digital copy of this Discovery Report.

Table 15: LOMCs in the Project Area

County	Community	Number of LOMA/ LOMR-Fs	Number of LOMRs	Effective Date
GENESEE	ALABAMA, TOWN OF	0		11/18/1983
	ELBA, TOWN OF	3		6/4/1976
	ELBA, VILLAGE OF	0		1/20/1984
	OAKFIELD, TOWN OF	0		5/25/1984
	OAKFIELD, VILLAGE OF	0		3/23/1984
MONROE	BROCKPORT, VILLAGE OF	0		08/28/2008
	CLARKSON, TOWN OF	7		08/28/2008
	GATES, TOWN OF	57		08/28/2008
	GREECE, TOWN OF	61		08/28/2008
	HAMLIN, TOWN OF	15		08/28/2008

County	Community	Number of LOMA/ LOMR-Fs	Number of LOMRs	Effective Date
MONROE (CONT'D)	HILTON, VILLAGE OF	0		08/28/2008
	OGDEN, TOWN OF	6		08/28/2008
	PARMA, TOWN OF	15		08/28/2008
	SPENCERPORT, VILLAGE OF	5		08/28/2008
	SWEDEN, TOWN OF	0		08/28/2008
NIAGARA	BARKER, VILLAGE OF	0		9/17/2010
	CAMBRIA, TOWN OF	5		9/17/2010
	HARTLAND, TOWN OF	0		9/17/2010
	LEWISTON, TOWN OF	5		9/17/2010
	LEWISTON, VILLAGE OF	0		9/17/2010
	LOCKPORT, CITY OF	0		9/17/2010
	LOCKPORT, TOWN OF	4		9/17/2010
	MIDDLEPORT, VILLAGE OF	1		9/17/2010
	NEWFANE, TOWN OF	4		9/17/2010
	PORTER, TOWN OF	8		9/17/2010
	ROYALTON, TOWN OF	0		9/17/2010
	SOMERSET, TOWN OF	0		9/17/2010
	WILSON, TOWN OF	12		9/17/2010
	WILSON, VILLAGE OF	2		9/17/2010
ORLEANS	ALBION, TOWN OF	0		8/8/1980
	ABION, VILLAGE OF	0		11/30/1979
	BARRE, TOWN OF	1		10/15/1981
	CARLTON, TOWN OF	3		11/1/1978
	CLARENDON, TOWN OF	0		1/31/1983
	GAINES, TOWN OF	1		6/8/1984
	HOLLEY, VILLAGE OF	0		11/30/1979
	KENDALL, TOWN OF	1		5/1/1978
	LYNDONVILLE, TOWN OF	1		9/16/1981
	MEDINA, VILLAGE OF	0		3/28/1980
	MURRAY, TOWN OF	2		3/21/1980
	RIDGEWAY, TOWN OF	0		9/14/1979
	SHELBY, TOWN OF	1		12/22/1983
	YATES, TOWN OF	0		9/29/1978

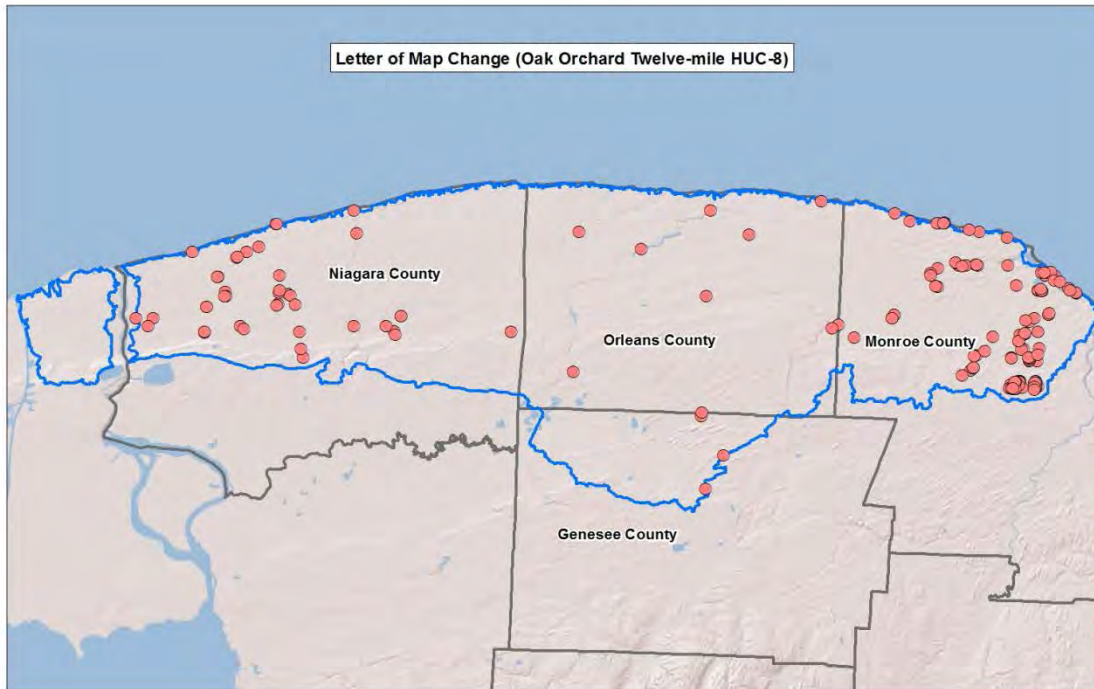


Figure 7: Location of LOMCs in the Oak Orchard-Twelve-mile Watershed

Community Assistance Visits (CAVs)

Statewide Community Assistance Visits (CAVs) are part of the evaluation and review process used by FEMA, NYSDEC Floodplain Management staff, and local officials to ensure that each community adequately enforces local floodplain management regulations to remain in compliance with NFIP requirements. Generally, a CAV consists of a tour of the floodplain, an inspection of community permit files, and meetings with local appointed and elected officials. During a CAV, observations and investigations will focus on identifying issues in various areas, such as community floodplain management regulations/ordinances, community administration and enforcement procedures, engineering or other issues related to FIRMs, other problems in community floodplain management, and problems with the Biennial Report data.

Any administrative problems or potential violations identified during a CAV will be documented in the CAV findings report. The community will be notified and given the opportunity to correct administrative procedures and remedy any violations to the maximum extent possible within established deadlines.

CAVs are also a way to provide technical assistance to communities. If administrative problems or potential violations are identified, the community will be notified and given the opportunity to correct those administrative procedures and remedy the violations to the maximum extent possible within established deadlines. FEMA or the State will work with the community to help bring the program into compliance with NFIP requirements. In extreme cases where the community does not take action to bring itself into compliance, FEMA may initiate an enforcement action against the community. A program deficiency is a defect in a community's floodplain management regulations or administrative procedures that impacts effective

implementation of floodplain management regulations in 44 CFR sections 60.3, 60.4, or 60.6. “Open” CAVs can be indicative of unresolved violations.

Table 16 lists the CAVs performed within the Project Area. No open CAVs were found for the coastal communities in the Oak Orchard-Twelvemile Watershed. As shown in the table, three communities (Town of Lewiston, Village of Barker, and Town of Royalton) in Niagara County had serious problems with ordinances, enforcement, or engineering during their 2008 CAVs. The Town of Porter in Niagara County had minor problems noted for ordinance, enforcement, engineering and other during their 2008 CAV. The Town of Lewiston’s violations required remedial actions to close the CAV.

Twenty of the 44 communities within the study area have not had a CAV since 1991.

If administrative problems or potential violations are identified, the community will be notified and given the opportunity to correct those administrative procedures and remedy the violations to the maximum extent possible within established deadlines. FEMA or the State will work with the community to help bring the program into compliance with NFIP requirements. In extreme cases where the community does not take action to bring itself into compliance, FEMA may initiate an enforcement action against the community.

During the Discovery process of this study, stakeholders were provided with information regarding NFIP requirements that are associated with coastal hazard zones, as well as information about new FEMA guidance related to moderate wave action. These topics, including coastal SFHAs, building requirements in VE Zones, and LiMWA are compiled below and discussed in greater detail.

Community Assistance Contacts (CACs)

Community Assistance Contacts (CACs) in the watershed have been more sporadic during the last 20 years. CACs are a tool employed by the State of New York and the NFIP to periodically contact a community to see if they are having any difficulties in administering the local floodplain management ordinance or program. A CAC is an additional way of determining if a CAV should be scheduled. CACs are also a means of encouraging Code Enforcement Officers (CEOs) to attend annual floodplain management workshops. CACs can serve to support local officials when they need help effective administrating the NFIP in their community.

Table 16: CAVs Performed Within the Project Area

County	Community	CAV Date	CAC Date	Summary of Problems/Violations
GENESEE	ALABAMA, TOWN OF	N/A	07/08/92	N/A
	ELBA, TOWN OF	N/A	N/A	N/A
	VILLAGE OF ELBA	N/A	N/A	N/A
	OAKFIELD, TOWN OF	N/A	N/A	N/A
	OAKFIELD, VILLAGE OF	N/A	N/A	N/A
	BROCKPORT, VILLAGE OF	N/A	N/A	N/A
MONROE	CLARKSON, TOWN OF	6/16/2010	N/A	Minor Enforcement
	GATES, TOWN OF	7/22/2003	12/02/08	Minor Enforcement
	GREECE, TOWN OF	4/17/2012	N/A	Minor Engineering
	HAMLIN, TOWN OF	10/2/2012	N/A	None

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County	Community	CAV Date	CAC Date	Summary of Problems/Violations
MONROE (CONT'D)	HILTON, VILLAGE OF	2/6/2003	N/A	Minor Ordinance
	OGDEN, TOWN OF	6/15/2010	N/A	Minor Engineering
	PARMA, TOWN OF	7/7/2009	N/A	None
	SPENCERPORT, VILLAGE OF	6/4/2008	N/A	None
	SWEDEN, TOWN OF	N/A	N/A	N/A
NIAGARA	BARKER, VILLAGE OF	3/4/2008	05/26/09	Serious Enforcement, Serious Other
	CAMBRIA, TOWN OF	6/27/2013	N/A	None
	HARTLAND, TOWN OF	N/A	N/A	N/A
	LEWISTON, TOWN OF	2/20/2008	N/A	Minor Enforcement, Serious Engineering
	LEWISTON, VILLAGE OF	N/A	N/A	N/A
	LOCKPORT, CITY OF	12/20/2011	N/A	Minor Enforcement
	LOCKPORT, TOWN OF	7/21/2009	12/07/11	Minor Enforcement, Minor Other
	MIDDLEPORT, VILLAGE OF	4/15/2008	N/A	None
	NEWFANE, TOWN OF	12/8/2009	N/A	None
	PORTER, TOWN OF	4/9/2008	N/A	Minor Ordinance, Minor Enforcement, Minor Engineering, Minor Other
	ROYALTON, TOWN OF	4/15/2008	N/A	Serious Engineering
	SOMERSET, TOWN OF	3/19/1998	07/30/03	Minor Enforcement, Minor Engineering
	WILSON, TOWN OF	10/23/2012	N/A	None
	WILSON, VILLAGE OF	N/A	N/A	N/A
	YOUNGSTOWN, VILLAGE OF	N/A	N/A	N/A
ORLEANS	ALBION, TOWN OF	9/7/1993	N/A	Minor Engineering
	ALBION, VILLAGE OF	N/A	06/23/09	N/A
	BARRE, TOWN	N/A	N/A	N/A
	CARLTON, TOWN OF	8/10/2007	N/A	Minor Ordinance
	CLARENDON, TOWN OF	N/A	N/A	N/A
	GAINES, TOWN OF	N/A	01/23/07	N/A
	HOLLEY, VILLAGE OF	N/A	N/A	N/A
	KENDALL, TOWN OF	5/29/2008	N/A	Minor Ordinance, Minor Other
	LYNDONVILLE, VILLAGE OF	8/1/2011	N/A	Minor Ordinance
	MEDINA, VILLAGE OF	N/A	N/A	N/A
	MURRAY, TOWN OF	N/A	N/A	N/A
	RIDGEWAY, TOWN OF	N/A	N/A	N/A
	SHELBY, TOWN OF	N/A	N/A	N/A
	YATES, TOWN OF	8/1/2011	N/A	Minor Ordinance

Community Rating System (CRS)

The Community Rating System (CRS) is a voluntary incentive program that provides flood insurance premium discounts to NFIP-participating communities that take extra measures to manage floodplains above the minimum requirements. A point system is used to determine a CRS rating. The more measures a community takes to minimize or eliminate exposure to floods, the more CRS points are awarded and the higher the discount on flood insurance premiums.

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As a result, flood insurance premium rates are discounted from 5- to 45 percent to reflect the reduced flood risk resulting from a community's actions successfully meeting the three CRS goals:

1. Reduce flood damage to insurable property;
2. Strengthen and support the insurance aspects of the NFIP, and
3. Encourage a comprehensive approach to floodplain management.

As of May 1, 2013, the Town of Greece in Monroe County was a Class 8 participating CRS community. The Town entered into the CRS program in October 1992. No other communities within the study area participate in the CRS. For more information on CRS, please see Attachment 6 - *Joining the CRS Program*, or visit FEMA's [CRS website](#).

A particular emphasis on joining the NFIP's CRS program would be of benefit to all watershed communities. There seems to be a great deal of misinformation and lack of communication as to what the CRS is; if a community is eligible for membership; and what level of effort is required to make CRS participation beneficial for a community. Local communities may wish to consider pooling resources/efforts or work on a countywide-basis to ease the effort of complying with the requirements of joining the CRS program. All communities within the Oak-Orchard Twelve-mile Watershed expressed an interest within their Hazard Mitigation Plans (HMPs) to participate in the CRS.

Repetitive Loss/Severe Repetitive Loss Properties

A Repetitive Loss (RL) is a property that has received two or more claim payments of more than \$1,000 from the NFIP within any rolling 10-year period. The communities within the Oak Orchard-Twelve-mile Watershed have experienced 26 RLs within the study area, accounting for \$307,719 in claims paid as of August 2012. Sixteen of the losses have occurred within Monroe County accounting for \$274,051 of the claims paid. The Town of Ogden and the Village of Spencerport have experienced the most claims paid. These data are shown in Table 17: *Repetitive Losses in the Study Area*.

Table 17: Repetitive Losses in the Study Area

County	Community	Number of Losses	Total Claims Paid
GENESEE	ALABAMA, TOWN OF	N/A	N/A
	ELBA, TOWN OF	N/A	N/A
	VILLAGE OF ELBA	N/A	N/A
	OAKFIELD, TOWN OF	N/A	N/A
	OAKFIELD, VILLAGE OF	N/A	N/A
MONROE	BROCKPORT, VILLAGE OF	N/A	N/A
	CLARKSON, TOWN OF	N/A	N/A
	GATES, TOWN OF	2	\$4,162
	GREECE, TOWN OF	3	\$9,781
	HAMLIN, TOWN OF	4	\$26,298
	HILTON, VILLAGE OF	N/A	N/A
	OGDEN, TOWN OF	2	\$109,263
	PARMA, TOWN OF	2	\$23,172
	SPENCERPORT, VILLAGE OF	3	\$101,375
	SWEDEN, TOWN OF	N/A	N/A

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County	Community	Number of Losses	Total Claims Paid
NIAGARA	BARKER, VILLAGE OF	N/A	N/A
	CAMBRIA, TOWN OF	N/A	N/A
	HARTLAND, TOWN OF	N/A	N/A
	LEWISTON, TOWN OF	N/A	N/A
	LEWISTON, VILLAGE OF	N/A	N/A
	LOCKPORT, CITY OF	N/A	N/A
	LOCKPORT, TOWN OF	N/A	N/A
	MIDDLEPORT, VILLAGE OF	N/A	N/A
	NEWFANE, TOWN OF	N/A	N/A
	PORTER, TOWN OF	N/A	N/A
	ROYALTON, TOWN OF	8	\$26,475
	SOMERSET, TOWN OF	N/A	N/A
	WILSON, TOWN OF	N/A	N/A
	WILSON, VILLAGE OF	N/A	N/A
	YOUNGSTOWN, VILLAGE OF	N/A	N/A
ORLEANS	ALBION, TOWN OF	N/A	N/A
	ALBION, VILLAGE OF	N/A	N/A
	BARRE, TOWN OF	N/A	N/A
	CARLTON, TOWN OF	2	\$7,193
	CLARENDON, TOWN OF	N/A	N/A
	GAINES, TOWN OF	N/A	N/A
	HOLLEY, VILLAGE OF	N/A	N/A
	KENDALL, TOWN OF	N/A	N/A
	LYNDONVILLE, VILLAGE OF	N/A	N/A
	MEDINA, VILLAGE OF	N/A	N/A
	MURRAY, TOWN OF	N/A	N/A
	RIDGEWAY, TOWN OF	N/A	N/A
	SHELBY, TOWN OF	N/A	N/A
	YATES, TOWN OF	N/A	N/A

Structures that flood frequently strain the NFIP Fund. In fact, RL properties are the biggest draw on the fund. FEMA has paid almost \$3.5 billion in claims for RL properties. RL properties not only increase the NFIP's annual losses and the need for borrowing funds from Congress, they drain funds needed to prepare for future catastrophic events.

Historical Flooding

Throughout the recorded history of the Oak Orchard-Twelvemile Watershed, flooding has been a constant threat. Floods in the early summer months are often associated with tropical storms moving north along the Atlantic coast. During the winter, flooding has been a threat when ice jams impede the free flow of floodwaters.

Flooding usually occurs in the late winter and early spring, when the ground is still frozen and snowmelt adds to heavy rainfall to produce increased runoff. Table 18: *FIS Historical Flooding Areas* summarizes the historical flooding noted in the FIS.

Table 18: FIS Historical Flooding Areas

County	Community	Event Date	Areas of Concern
GENESEE	BATAVIA, CITY OF	March 1, 1942	Flooding along Tonawanda Creek has occurred as a consequence of heavy spring rains or spring thaw conditions in the hill area south of the city.
	BATAVIA, TOWN OF	1961	Tonawanda Creek flooded due to spring overflow on Walnut Street, Law Street, and South Main Street resulting in the flooding of several residences.
MONROE	BRIGHTON, TOWN OF HENRIETTA, TOWN OF ROCHESTER, CITY OF	March 1865	Flooding problems along the Genesee River are most apparent in the low-lying areas close to the river, where high water periodically inundates residences and summer cabins. Most major floods have occurred in late winter or early spring as a result of snowmelt and/or rainfall. The largest known flood occurred in March 1865, and had an estimated discharge of 54,000 cubic feet per second (cfs).
	FAIRPOINT, VILLAGE OF	June 1972	Tropical Storm Agnes produced basement flooding in the vicinity of State Street, Water Street, and Railroad Street. Flooding from the New York State Barge Canal was also reported at the spillway structure near the Conrail tracks.
	IRONDEQUOIT, TOWN OF WEBSTER, TOWN OF	1864	Major floods on Irondequoit Creek can occur during any season of the year. Several serious floods have occurred involving Irondequoit Creek dating back to 1864 when the largest, most extensive flood to date caused considerable damage. The most damaging floods of Lake Ontario and Irondequoit Bay occur during high water levels caused by major changes in the cycle of precipitation.
	MENDON, TOWN OF	June 21-23, 1972	The principal flooding sources in the Town of Mendon are Honeoye Creek and Irondequoit Creek and their primary tributaries. Heavy rains, especially those in the spring, combined with snowmelt, have frequently high water and flooding. Tropical Storm Agnes rained approximately 4.5 inches in a three day period. On Honeoye Creek the maximum recorded discharge was 4,800 cfs with a recurrence interval of approximately 30 years.
	PERINTON, TOWN OF		Flooding can occur in the community during any season of the year, but it most likely occurs in the late winter-early spring months when the melting snow may combine with intense rainfall to produce increased runoff. Ice jams and debris have often increased flood heights by impeding water flow at bridges and culverts. Areas along Thomas Creek, White Brook, and their tributaries are also highly susceptible to flooding and ponding. This is due to the flatness of the land in those areas.

County	Community	Event Date	Areas of Concern
MONROE (cont'd)	PENFIELD, TOWN OF		Major floods have occurred in Penfield during all season. Generally these floods are caused by such factors as localized thunderstorms, spring rains combined with snow melt, and tropical depressions or hurricanes. Large magnitude floods have occurred in 1864, 1912, 1934, 1960, and 1974. The 1960 flood on Irondequoit Creek was estimated to be a 25-year event.
	PITTSFORD, TOWN OF	June 1972	The worst flooding conditions in Pittsford usually occur during periods of prolonged spring thaw, following a season of heavy snowfall, and accompanied by a severe spring rainstorm. Irondequoit Creek and its tributary Mill Creek cause widespread flooding and damage to crops in the region between their southerly headwaters in the Town of Pittsford to the New York State Barge Canal. During the flooding of June 1972, Park Road was inundated with several inches of water and was closed to traffic.
NIAGARA	BARKER, VILLAGE OF		Flooding problems are caused by the overflow of Golden Hill Creek. Prolonged spring thaws and heavy summer rainfall create the most severe flooding conditions.
	LOCKPORT, CITY OF		In the City of Lockport, low-lying areas are subject to flooding caused by the overflow of Eighteen-mile Creek, Gulf Branch and Lincoln Avenue Branch. Heavy rains in conjunction with snowmelt and ice jams in the early spring cause the most severe flooding.
	LOCKPORT, TOWN OF		In the Town of Lockport, floods in Tonawanda Creek are caused by snowmelt coupled with rainfall in the late winter and early spring. The floods from Tonawanda Creek generally overflow and cause floods in the Mud Creek Watershed.
	MIDDLEPORT, VILLAGE OF		In the Village of Middleport, flooding primarily occurs along Johnson Creek 2 Tributary 1, where an underground culvert system was inadequately designed and holds capacity less than the 10-percent-annual-chance discharge. Debris collects at the trash rack of the opening to the system and obstructs flow to further add to overland flooding.
	NEWFANE, TOWN OF		In the Town of Newfane, flooding is confined to low-lying areas adjacent to Lake Ontario on the east and west sides of Eighteen-mile Creek. This usually occurs when heavy rains and high winds cause Lake Ontario's water levels to rise. However, some local floods along the channel may be attributed to ice jams.
	PORTER, TOWN OF		In the Town of Porter, flooding primarily occurs along the Niagara River during the spring thaw resulting from ice jams on the river. Other flooding in the area can be attributed to undersized or clogged culverts.

County	Community	Event Date	Areas of Concern
NIAGARA (cont'd)	SOMERSET, TOWN OF		In the Town of Somerset, flooding has occurred at Golden Hill Creek and Fish Creek 2. Flatlands and farm pastures adjacent to the streams are subject to periodic flooding, usually a result of prolonged spring thaws and heavy summer rainfalls. Additionally, along Lake Ontario, high lake levels and prolonged easterly and northerly winds have resulted in considerable shoreline erosion and loss of private property.
	WILSON, TOWN OF		In the Town of Wilson, flooding from heavy rains and high winds and water levels along Lake Ontario can occur. Flooding usually occurs in mostly undeveloped, low-lying areas of the town. Erosion along the lake shore occurs due to wave action and high water levels, caused by heavy rains and high winds.
	WILSON, VILLAGE OF		In the Village of Wilson, flooding occurs along the shoreline of Lake Ontario and inland along the banks of Twelve-mile Creek, East Branch.
	YOUNGSTOWN, VILLAGE OF		In the Village of Youngstown, flooding primarily exists along the lower level of the bank of the Niagara River, usually due to ice jams. Because of limited differences in elevations between different parts of the community, stormwater runoff causes ponding, and local drainage facilities are inadequate.
ORLEANS	CARLTON, TOWN OF		The Lake Ontario shoreline in Carlton is subject to significant damage to flooding and erosion caused by inundation and wind generated waves.
	KENDALL, TOWN OF		Coastline flooding is significant in Kendall because there are few bluffs to protect property from inundation of the type that exists along much of the Lake Ontario shoreline.
	YATES, TOWN OF		Stream flood problems in the Town of Yates exist due to the low banks and flat terrain in the areas along Johnson Creek.

Historical flooding events were also included in several community HMPs. Significant events from these plans are summarized in Table 19: *Hazard Mitigation Plan Significant Flood Events*. Many spring snowmelt and fall rainfall events have resulted in substantial flooding and significant damage to property and infrastructure within the Oak Orchard-Twelve-mile Watershed. Monroe and Niagara Counties provided historical flood events at the county level, with no distinction for the municipalities included in the events. Flash flooding on the Tonawanda River in Niagara County has caused significant damages.

The Town of Oakfield in Genesee County included one event from 1989; the HMP also included several county-wide events for major flooding along the Tonawanda and Oatka Creeks that resulted in significant damage from 1904 to 2004.

See the Hazard Mitigation subsection that follows for additional information on HMPs.

Table 19: Hazard Mitigation Plan Significant Flood Events

County	Community	Flood Events of Significance
GENESEE	ALABAMA, TOWN OF	No Town specific events provided.
	ELBA, TOWN OF	No Town specific events provided.
	VILLAGE OF ELBA	No Village specific events provided.
	OAKFIELD, TOWN OF	June 22, 1989: Severe flash flooding from a major rainstorm led to damaged roads and bridges. Estimated damages of \$10,000.
	OAKFIELD, VILLAGE OF	No Village specific events provided.
MONROE	BROCKPORT, VILLAGE OF	County level events included for all municipalities. June 1972: Remnants of Hurricane Agnes caused road and bridge washouts, building damage, and evacuations.
	CLARKSON, TOWN OF	October 1974: Sewer tunnel cracked and caused flooding which damaged homes, destroyed roads, and displaced residents. Damages estimated in the millions.
	GATES, TOWN OF	July 1996: Two inches of rain in 4 hours caused flash flooding and basement damages estimated at \$45,000.
	GREECE, TOWN OF	October 1996: Flash flooding with damages over \$100,000.
	HAMLIN, TOWN OF	February 1997: Earthen dam gave way and caused flooding on roadways and residential properties. Damages estimated at \$4,000.
	HILTON, VILLAGE OF	January 1998: Heavy rainfall on saturated ground caused local creek cresting at record levels, basement flooding, and various water emergencies. Damages estimated at \$100,000.
	OGDEN, TOWN OF	January 1999: Rapid snowmelt caused runoff flooding in areas with poor drainage, which led to road closures and evacuations. Damages estimated at \$55,000.
	PARMA, TOWN OF	May 2000: Heavy rains and hail caused substantial erosion of roadways. Damages estimated at \$180,000.
	SPENCERPORT, VILLAGE OF	September 2004: Hurricane Frances caused widespread and significant flooding, causing multiple States of Emergency declarations, evacuations, and road closures. Damages estimated at approximately \$2.5 million.
	SWEDEN, TOWN OF	July 2006: Rains overflowed creeks, flooded basements, and created sinkholes - including one very large crater from a drainage system implosion.

County	Community	Flood Events of Significance
NIAGARA	BARKER, VILLAGE OF	March 1995: Flood event with damages estimated at \$50,000.
	CAMBRIA, TOWN OF	April 1993: Flood of Tonawanda Creek with damages estimated at \$500,000.
	HARTLAND, TOWN OF	January 1998: Flash flooding, urban flooding, and small creek and stream overflow with damages estimated at \$51 million.
	LEWISTON, TOWN OF	January 1999: Flash flood of Tonawanda Creek with damages estimated at \$50,000.
	LEWISTON, VILLAGE OF	January 1999: Flash flood of Tonawanda Creek with damages estimated at \$15,000.
	LOCKPORT, CITY OF	November 1999: Flash flood that caused urban flooding with damages estimated at \$500,000.
	LOCKPORT, TOWN OF	June 2002: Flash flood of Tonawanda Creek with damages estimated at \$50,000.
	MIDDLEPORT, VILLAGE OF	March 2003: Flood of Tonawanda Creek with damages estimated at \$275,000.
	NEWFANE, TOWN OF	September 2004: Flood of Tonawanda Creek with damages estimated at \$3.5 million.
	PORTER, TOWN OF	April 2005: Flood of Tonawanda Creek with damages estimated at \$600,000.
	ROYALTON, TOWN OF	
	SOMERSET, TOWN OF	
	WILSON, TOWN OF	
	WILSON, VILLAGE OF	
	YOUNGSTOWN, VILLAGE OF	
ORLEANS	ALBION, TOWN OF	August 1996: Rapid rainfall flooded streets and basements. October 1996: Flash flooding.
	ALBION, VILLAGE OF	January 1995: Heavy rain caused Village to be declared in a State of Emergency.
	BARRE, TOWN	No Town specific events provided.
	CARLTON, TOWN OF	No Town specific events provided.
	CLARENDON, TOWN OF	No Town specific events provided.
	GAINES, TOWN OF	No Town specific events provided.
	HOLLEY, VILLAGE OF	April 1996: Persistent rains fell on saturated ground resulting in urban and small stream flooding.
	KENDALL, TOWN OF	June 2005: Up to 5 inches of rain fell from thunderstorms, closing and damaging roads. Remnants of Hurricane Arlene caused flooding that led to street closures because of runoff debris accumulation.
	LYNDONVILLE, VILLAGE OF	No Village specific events provided.
	MEDINA, VILLAGE OF	August 1996: 3-5 inches of rain in a 3-hour period caused street and basement flooding. July 1997: Heavy rains caused urban flooding.
	MURRAY, TOWN OF	June 2005: Heavy rainfall caused flooding and led to the collapse of a 50-foot section of the south bank of the Erie Canal.
	RIDGEWAY, TOWN OF	No Town specific events provided.
	SHELBY, TOWN OF	No Town specific events provided.
	YATES, TOWN OF	July 1999: Heavy downpours caused localized drainage problems and power outages.

Declared Disasters

Like much of the eastern United States, one of the most frequent, wide-spread, and damaging natural disasters affecting the watershed is flooding from rainfall events; especially tropical systems tracking inland from the Atlantic Seaboard. With full records beginning in the 1950s, the watershed has repeatedly been subject to flooding from tropical storms, hurricanes, and other non-cyclonic events, most recently Hurricane Irene and Tropical Storm Lee, which struck the area in August and September 2011, respectively.

Often in the aftermath of a major flooding event, the Federal government will make funding available for homeowners, businesses and local communities to aid in disaster relief and recovery. The major flood-related disaster declarations for the study area are listed in Table 20: *Disaster Declarations*. Since 1972 there have been 12 flood-related declared disasters within the study area. FEMA's disaster declarations and emergency declarations Disaster history can be viewed at FEMA's website.

Table 20: Disaster Declarations

Date	Title of Event	Number of Counties Declared within Study Area
6/1/1972	New York Tropical Storm Agnes	1
3/1/1973	New York High Winds, Wave Action, Flooding	4
3/1/1976	New York Ice Storm, Severe Storms, Flooding	2
3/1/1985	New York Snow Melt, Ice Jams	1
June & July 1998	New York Severe Storms and Flooding	2
9/1/1998	New York Severe Storms	2
May to August 2000	New York Severe Storms	2
May & June 2004	New York Severe Storms and Flooding	4
August & September 2004	New York Severe Storms and Flooding	3
4/1/2005	New York Severe Storms and Flooding	1
10/1/2006	New York Severe Storms and Flooding	3
April & May 2011	New York Severe Storms, Flooding, Tornadoes, and Straight Line Winds	1

High Water Marks

A limited number of verified High Water Mark (HWM) data were available from the USGS or USACE prior to the Discovery Meeting. During the pre-Discovery and Discovery Meetings, communities were asked about additional known HWMs. Information obtained from the meetings included the popcorn stand along Salmon Creek in the Village of Hilton. No specific details were provided for the HWMs noted by the communities.

Ice Jams

As explained by the National Weather Service (NWS), “ice jams cause localized flooding and can quickly cause serious problems. Rapid rises behind the jams can lead to temporary lakes and flooding of homes and roads along rivers. A sudden release of a jam can lead to flash flooding below with the addition of large pieces of ice in the wall of water which will damage or destroy most things in its path”.

There are two types of ice jams: Freeze up and Break up. Freeze up jams usually occur in early to mid winter during extremely cold weather. Break up jams usually occur in mid to late winter with thaws. The NWS notes the conditions of both below:

Freeze Up Jam Criteria:

Three Consecutive Days with daily average temperatures of less than 0°F. Early to midwinter formation, fairly steady discharge, frazil and broken border ice, unlikely to release suddenly, smooth to moderate surface roughness.

Break Up Jam Criteria:

Ice around 1 foot thick or more (presumed) and Daily Average Temperature forecast to be greater than 42°F or more. Direct sunlight plays a large role as open water areas absorb sunlight. A Break up jam can occur at any time after ice cover formation, but generally takes place in mid to late winter. Break up jams are highly unstable with sudden failures.

The daily average temperature is determined by the following equation:

$$(T_{\text{max}} (\text{maximum temperature}) + T_{\text{min}} (\text{minimum temperature}))/2.$$

Rainfall or snowmelt with a thaw will enhance the potential for break up jams as rising water helps to lift and break up the ice. A very short thaw with little or no rain or snowmelt may not be enough to break up thick ice.

It is critically important to note that flooding caused by ice jams is not calculated nor shown on FEMA’s FIRMs. Furthermore, the NWS’s statement on ice jams also explains that river forecasts found on its website do not take into account the effect of ice on river levels.

The following list identifies some of the known “trouble spots” of ice jamming in the watershed. The complete list with fuller descriptions of the circumstances of jamming at each location can be found on the USACE website:

<http://rsgisias.crrel.usace.army.mil/apex/f?p=273:2:0::NO>

Allen Creek	Rochester
Genesee River	Rochester
Niagara River	Lewiston
Tonawanda Creek	Alabama, Batavia
West Creek	Hilton

Ice Jam Preparedness

1. Monitoring areas to identify problem areas early
2. Alert system for evacuation
3. Mitigation
 - a. Ice weakening/thinning/removal
 - b. Equipment placement
 - c. Supplies
 1. Sandbags
 2. Jersey barriers
4. Permanent Measures
 - a. Freezeup Jam Control
 1. displace jam location
 2. control production and transport of frazil ice
 - b. Breakup Jam Control
 1. control timing of breakup
 2. displace jam location

Hazard Mitigation Plans

The Disaster Mitigation Act of 2000 (DMA2K) was passed by Congress and signed into law by President Clinton on October 30, 2000, to amend the Robert T. Stafford Disaster Relief and Emergency Assistance Act. The law established a national disaster hazard mitigation grant program in an effort to reduce the rising cost of disasters throughout the country by encouraging Federal, State, and local authorities to work together to develop sustained and successful mitigation action programs.

Section 322, Mitigation Planning, of DMA2K outlines the need for a jurisdiction-specific HMP. It requires local governments to prepare and adopt jurisdiction-wide hazard mitigation plans for disasters declared after November 1, 2003 (subsequently revised to November 1, 2004) as a condition of receiving Hazard Mitigation Grant Program (HMGP) project grants and other forms of non-emergency disaster assistance. Local governments must review the mitigation plan annually and update it every 5 years from the date of the plan's adoption to continue program eligibility.

The requirements of local mitigation plans are found in 44 CFR Part 201.6. FEMA's Local Multi-Hazard Mitigation Planning Guidance was updated in October 2011 and provides the official interpretations and explanation of the regulations. Additional information on hazard mitigation planning is available at:

<http://www.fema.gov/plan/mitplanning>

A local HMP is a long-term strategic/guidance document used by an entity to reduce future risk to life, property, and the economy in a community. The purpose of the HMPs is to:

- Protect life, safety, and property by reducing the potential for future damages and economic losses that result from natural hazards;
- Qualify for additional grant funding, in both the pre-disaster and post-disaster environment;
- To speed recovery and redevelopment following future disaster events;

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- To demonstrate a firm local commitment to hazard mitigation principles; and
- To comply with both State and Federal legislative requirements for local HMPs.

The County and municipal HMPs outline mitigation actions which officials believe are attainable and can be implemented. Some of these activities include:

- Reduce the number of critical facilities in hazard prone areas including those locations in local jurisdictions. Reduce the future development of facilities in flood inundation zones.
- Reduce the number of critical facilities in hazard prone areas including those locations in local jurisdictions. Map out all critical facilities in SFHAs
- Develop regulations that require zero-increase in runoff
- Raise structures located in flood-prone areas
- Require flood proofing building construction methods
- Develop a comprehensive plan to relocate critical facilities to safer areas

Status of Approved Mitigation Plans

As of June 30, 2013, 175 communities within the Lake Ontario study area had approved HMP; 46 of the HMPs expired in Fall 2013. These plans identify potential hazards and threats that face the community. Subsequent to the completion of the HMPS, the communities are eligible to receive grants for future mitigation projects through the HMGP. There are numerous advantages to mitigation. The creation of a mitigation plan helps local officials identify potential future hazards. Once the threats are identified, the communities can identify mitigation actions/projects/strategies to eliminate or minimize the impact a potential hazard would cause. Preventative measures are also cost effective; preventing the impact of a hazard will cost less than cleaning up after a disaster occurs. Mitigation can prevent the loss of lives as well as property damage. These plans focus on the exposure of critical facilities and community-owned assets to potential hazards and address ways to reduce their vulnerability to these threats. Some of these actions/projects/strategies may take little time to employ, while others may take years to implement.

HMPs are often completed at the county or regional level. At the local level, each municipal government also adopts the HMP, as an individual plan or regional plan. Each municipal HMP was reviewed for initiatives, critical facilities, and mitigation actions. The status of the approved HMPs is shown in Table 21: *Approved Hazard Mitigation Plans*. Communities without an HMP may be in the process of developing a plan. Local HMPs are required to be updated every 5 years and revised to include recent events, new analysis, and best available data.

Table 21: Approved Hazard Mitigation Plans

County	Community	Approval Date	Expiration Date
GENESEE	ALABAMA, TOWN OF	8/23/2011	8/23/2016
	ELBA, TOWN OF		
	VILLAGE OF ELBA		
	OAKFIELD, TOWN OF		
	OAKFIELD, VILLAGE OF		
MONROE	BROCKPORT, VILLAGE OF	8/15/2011	8/15/2016
	CLARKSON, TOWN OF		
	GATES, TOWN OF		
	GREECE, TOWN OF		
	HAMLIN, TOWN OF		
	HILTON, VILLAGE OF		
	OGDEN, TOWN OF		
	PARMA, TOWN OF		
	SPENCERPORT, VILLAGE OF		
NIAGARA	SWEDEN, TOWN OF	11/10/2009	11/10/2014
	BARKER, VILLAGE OF		
	CAMBRIA, TOWN OF		
	HARTLAND, TOWN OF		
	LEWISTON, TOWN OF		
	LEWISTON, VILLAGE OF		
	LOCKPORT, CITY OF		
	LOCKPORT, TOWN OF		
	MIDDLEPORT, VILLAGE OF		
	NEWFANE, TOWN OF		
	PORTER, TOWN OF		
	ROYALTON, TOWN OF		
	SOMERSET, TOWN OF		
	WILSON, TOWN OF		
	WILSON, VILLAGE OF		
	YOUNGSTOWN, VILLAGE OF		
ORLEANS	ALBION, TOWN OF	9/2/2008	9/2/2013
	ALBION, VILLAGE OF		
	BARRE, TOWN OF		
	CARLTON, TOWN OF		
	CLARENDON, TOWN OF		
	GAINES, TOWN OF		
	HOLLEY, VILLAGE OF		
	KENDALL, TOWN OF		
	LYNDONVILLE, VILLAGE OF		
	MEDINA, VILLAGE OF		
	MURRAY, TOWN OF		
	RIDGEWAY, TOWN OF		
	SHELBY, TOWN OF		
	YATES, TOWN OF		

Critical Facilities and Infrastructures

Critical facilities are those entities that are essential to the community's health and welfare. Critical facilities included in the HMPs vary based on how the locality defines a critical facility/infrastructure and the types of data available. Critical facilities often include 911 and emergency services facilities, airports, colleges and universities, schools, fire departments, police departments, sewage treatment plants, hospitals and nursing homes.

Some of the HMPs also identified facilities located within the SFHA. Table 22: *Critical Facilities and Infrastructure at risk of Flooding in the Oak Orchard-Twelvemile Watershed* summarizes the critical facilities that were noted in the HMPs as being at risk to flood-related events. Monroe County did not include a summary of the facilities located within the SFHA. The Town of Elba listed one facility within the SFHA, but did not specify the facility or type.

Niagara County reported seven critical facilities within the SFHA. Four schools and/or academic locations are located within flood zones in the Towns of Cambria, Lewiston, Porter and the City of Lockport. The Village of Barker police department, Town of Royalton fire department, and the Town of Wilson fire department are also located within SFHAs.

Orleans County has six unspecified critical facilities located within the SFHA. The facilities are located within the Town of Kendall, Village of Lyndonville, Town of Murray, and Town of Ridgeway.

Table 22: Critical Facilities and Infrastructure at risk of Flooding in the Oak Orchard-Twelvemile Watershed

County	Community	Facilities Located within SFHA
GENESEE	ALABAMA, TOWN OF	None Listed
	ELBA, TOWN OF	1
	VILLAGE OF ELBA	0
	OAKFIELD, TOWN OF	0
	OAKFIELD, VILLAGE OF	0
MONROE	BROCKPORT, VILLAGE OF	None Listed
	CLARKSON, TOWN OF	
	GATES, TOWN OF	
	GREECE, TOWN OF	
	HAMLIN, TOWN OF	
	HILTON, VILLAGE OF	
	OGDEN, TOWN OF	
	PARMA, TOWN OF	
	SPENCERPORT, VILLAGE OF	
	SWEDEN, TOWN OF	
NIAGARA	BARKER, VILLAGE OF	1 (Barker Village Police Department)
	CAMBRIA, TOWN OF	1 (Niagara County Community College)
	HARTLAND, TOWN OF	None Listed
	LEWISTON, TOWN OF	1 (unspecified school/academic institution)
	LEWISTON, VILLAGE OF	None Listed
	LOCKPORT, CITY OF	1 (unspecified emergency services facility)
	LOCKPORT, TOWN OF	None Listed
	MIDDLEPORT, VILLAGE OF	None Listed
	NEWFANE, TOWN OF	None Listed

County	Community	Facilities Located within SFHA
NIAGARA (CONT'D)	PORTER, TOWN OF	1 (unspecified school/academic institution)
	ROYALTON, TOWN OF	1 (Gasport Chemical Hose Co. Fire Department)
	SOMERSET, TOWN OF	None Listed
	WILSON, TOWN OF	1 (South Wilson Fire Company)
	WILSON, VILLAGE OF	None Listed
	YOUNGSTOWN, VILLAGE OF	None Listed
ORLEANS	ALBION, TOWN OF	None Listed
	ALBION, VILLAGE OF	None Listed
	BARRE, TOWN OF	None Listed
	CARLTON, TOWN OF	None Listed
	CLARENDON, TOWN OF	None Listed
	GAINES, TOWN OF	None Listed
	HOLLEY, VILLAGE OF	None Listed
	KENDALL, TOWN OF	1
	LYNDONVILLE, VILLAGE OF	2
	MEDINA, VILLAGE OF	None Listed
	MURRAY, TOWN OF	2
	RIDGEWAY, TOWN OF	1
	SHELBY, TOWN OF	None Listed
	YATES, TOWN OF	None Listed

Mitigation Projects

The HMPs also identified mitigation projects/actions/strategies to reduce long-term vulnerability to hazards. Each county listed several mitigation projects related to reducing flood vulnerability. The Town of Greece in Monroe County included completed mitigation actions, such as drainage improvements near Wood-Run.

County level mitigation actions were provided for Genesee County. Mitigation actions include FIRM updates, participation in the CRS, creation of a municipal flood/drainage program, countywide survey of RL properties to develop mitigation options, raising minimum BFE requirements, assisting with flood mitigation for citizens, and conducting an assessment of dams with replacement of faulty flood-control devices.

Monroe County communities included a diverse mitigation strategy for drainage improvements, GIS capabilities for modeling inundation, joining the CRS, and buyouts of repetitive flooding areas. The Town of Gates included mitigation actions for developing multi-lot LOMAs. The Town of Greece specified drainage study strategies for Fleming and Veness Creeks, and the Town of Parma included infrastructure upgrades to bridges and stormwater structures.

Niagara County mitigation actions were focused on stormwater upgrades and management. Specific actions range from stormwater management plans, monitoring ditch programs, and conducting drills of community EAPs.

All communities within Orleans County included mitigation actions for participation in the CRS and participating in the county-wide drainage district. The Village of Lyndonville and Town of Yates included assessing the safety of the Lyndonville dam. The Village of Medina mitigation actions were related to the Glenwood dam, preparing a study for the southwest portion of the Village that has flooding/drainage problems, and the purchase of a large capacity pump for high water events. County-level mitigation actions include the updating of FIRMs,

participation in CRS, communication with Canal Corporation, conducting a safety analysis of dams, and developing a flood warning system for Oak Orchard and Johnson creeks.

Municipal Separate Storm Sewer Systems (MS4s)

Two pieces of legislation in the early 1970s — the Clean Water Act and the Safe Drinking Water Act — have contributed mightily to the quality of the water we drink, fish and swim in today. Prior to enactment of these landmark laws, as much as two-thirds of the surface water in the United States was considered polluted. The Nation's waters are noticeably cleaner and less polluted, and today, we can fish and swim in virtually all our streams, rivers, lakes and oceans.

Water resources are central to the region's aesthetics, economics and health. There are some 60,000 miles of rivers and streams in FEMA Region 2, including the waterways of the St. Lawrence Seaway. We all live in a watershed - the area that drains to a common waterway. Many water quality and ecosystem problems are best solved at the watershed level rather than at the individual water body or discharger level. Due to our geographic diversity, New York has a wide variety of water bodies and a number of programs to protect its estuaries, lakes, rivers and streams, wetlands, and oceans more efficiently and effectively.

As noted on the NYSDEC's website, Federal Stormwater Phase II regulations require permits for stormwater discharges from Municipal Separate Storm Sewer Systems (MS4s) in urban areas, and for construction activities that disturb one or more acres of land. To implement the law, the NYSDEC has developed two general permits, one for MS4s in urbanized areas and one for construction activities. The permits are part of the State Pollutant Discharge Elimination System (SPDES). Operators of regulated MS4s and operators of construction activities must obtain permit coverage under either an individual SPDES permit or one of the general permits prior to commencement of construction.

Guidance for local officials on complying with state and federal stormwater management requirements, Minimum Measures 4 and 5 can be found on the NYSDEC's website at <http://www.dec.ny.gov/chemical/9007.html>.

There have been 38 MS4 permits issued in the Oak Orchard-Twelvemile Watershed area.

Detailed maps that depict where the regulated MS4 boundaries lie can be found on the NYSDEC's website at: <http://www.dec.ny.gov/chemical/92258.html>.

Coordinated Needs Management Strategy (CNMS) and NFIP Mapping Needs

During FEMA's Flood Map Modernization program from 2003 to 2008, FEMA adhered to Procedure Memorandum No. 56, which states that "Section 575 of the National Flood Insurance Program Reform Act of 1994 mandates that at least once every five years FEMA assess the need to review and update all floodplain areas and flood risk zones identified, delineated, or established under Section 1360 of the National Flood Insurance Act, as amended." This requirement was fulfilled through the Mapping Needs Assessment process. Other mechanisms such as the Mapping Needs Update Support System and scoping reports were used to capture information describing conditions on the FIRMs and the potential for a map update. FEMA's CNMS was initiated through FEMA's Risk MAP program in 2009.

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CNMS is a FEMA initiative to update the way FEMA organizes, stores, and analyzes flood hazard mapping needs information for communities. CNMS defines an approach and structure for the identification and management of flood hazard mapping needs that supports data-driven planning and the flood map update investment process in a geospatial or GIS environment. The goal is to identify areas where existing flood maps are not up to FEMA's mapping standards.

There are three classifications within the CNMS: "Valid," "Unverified," and "Unknown." New and updated studies (those with new hydrologic and hydraulic models) performed during the Map Modernization program were automatically determined to be "Valid" and the remaining studies went through a 17 element validation process with 7 critical and 10 secondary elements. Validation elements apply physical, climatological, and environmental factors to stream studies to determine validity. A stream study has to pass all of the critical elements and at least seven secondary elements in order to be classified as "Valid." The remaining streams are classified as "Unverified."

The following seven Critical Elements or "checks" must be answered satisfactorily in order for a stream reach to be determined "valid":

- Change in the gage record: Has a major flood event caused a major change in gage record since effective analysis?
- Change in Discharge: Do the updated and effective peak discharges differ significantly based on confidence limit criteria in *FEMA's Guidelines and Specifications for Flood Hazard Mapping Partners (FEMA, 2003)* (G&S)?
- Model methodology: Is the model methodology no longer appropriate based on FEMA's G&S?
- Hydraulic Change: Has a major flood-control structure (dam/levee/floodwall/other change) been added or removed from the reach?
- Channel Reconfiguration: Is the current channel reconfiguration outside the effective SFHA? (Has the stream moved?)
- Other Hydraulic Changes: Have more than five hydraulic structures (bridge/culvert) been added or removed that impact BFEs on the reach?
- Channel Area Change: Has there been significant channel fill or scour?

If one or more of the above noted elements are true then the flood hazard information for the reach is "invalid". Not all may be applicable for all flooding sources.

In addition to the seven Critical Elements, if four or more of the following Secondary Elements are true, then Flood Hazard Information must be recorded as "Invalid."

- Regression Equation: Has a rural regression equations been used in a now urbanized area?
- Repetitive Loss: Are there repetitive losses outside the Special Flood Hazard Area (SFHA)?
- Impervious Area: Has there been an increase in impervious area in the sub-basin of more than 50 percent (i.e., 10 percent to 15 percent, 20 percent to 30 percent, etc.)?
- Hydraulic Structure: Have more than one, but less than five, hydraulic structures (bridge/culvert) been added or removed that impact BFEs on the reach?

- Channel Improvements: Have there been channel improvements or shoreline changes?
- Topography Data: Is better topography and/or bathymetry available?
- Vegetation or Land Use: What changes to vegetation or land use have occurred in the area?
- Coastal Dune: Failure to identify primary frontal dune in coastal areas?
- High Water Mark: Have significant storms occurred with recorded HWMs?
- Regression Equation: Are new regression equations available?

CNMS is a living database that is continuously updated whenever new or revised studies become available. As part of that update, valid stream reaches will be reassessed every 5 years and invalid streams will be prioritized for potential funding. Watershed Discovery Meetings will provide input for CNMS community requests and help prioritize studies in the watershed. It is projected that the CNMS geodatabase will eventually be available to the public online. Table 23: *Current Status of CNMS* shows the status of the counties in this project area prior to the Discovery process. Less than one-third of the CNMS mileage has been verified as valid within the study region. The majority of the mileage has been categorized as “unknown status.”

An informational flyer regarding CNMS can be found on-line at <https://www.rampp-team.com/documents/factsheets/cnms.pdf> or by reviewing Attachment 7 - *Coordinated Needs Management Strategy* in the digital version of this Discovery Report. More information about CNMS can also be found on FEMA’s CNMS webpage at <http://www.fema.gov/media-library/assets/documents/21436?id=4628> or by viewing an informative CNMS PowerPoint presentation of the process created by the Illinois State Water Survey at http://www.illinoisfloods.org/documents/2011_IAFSM_Conference/2%20Wednesday/3B_CNMS-Coordinated%20Needs%20Management%20Strategy.pdf.

Table 23: Current Status of CNMS

County	FIPS	Stream Mileage			
		Valid	Unverified	Unknown	Total
GENESEE	36037	0	0	57.0	57.0
MONROE	36055	121.9	7.2	80.7	209.8
NIAGARA	36063	82.6	14.1	173.4	270.1
ORLEANS	36073	0	0	190.8	190.8

Discovery Meetings - Community Discussion of Needs

During the WebEx2 sessions held in September 2013, and during the series of in-person meetings held in November 2013, mapping needs were catalogued for each of the participating communities. Each represented community met with facilitators to document areas of recurrent flooding, changes to hydraulic structures, areas of growth, and inaccuracies with the effective FEMA FIRMS.

The types of needs can be classified as:

- Unstudied streams in areas of growth and development
- Maps are old and impossible to read due to scale (several communities have flat fold maps)
- Need to have established BFEs on large bodies of water

Table 24: *Summary of Community Floodplain Mapping Needs* captures the ongoing discussion of needs that took place during the Discovery process. This table highlights the communities that participated in the planning, provided information on the Data Worksheets, and noted specific needs related to their effective FIRMs.

Approximately 60 percent of the communities within the Oak Orchard-Twelve-mile Watershed provided needs that have been captured in CNMS. Appendix H of this document includes a summary of the discussions in each of the communities that participated in the Discovery Meetings and/or submitted Data Worksheets. The CNMS database entries also include larger construction projects that were noted during the meetings with the Oak Orchard-Twelve-mile Watershed communities during 2013. These findings will be included in the main CNMS database.

V. Discovery Meetings

A series of conference calls with virtual meeting capabilities was held in August and September 2013, and was followed up with 10 in-person meetings held in November 2013 throughout the Lake Ontario Watershed.

The Lake Ontario Watershed Discovery project is the beginning of an interactive process that will result in a watershed-wide assessment of existing flood hazard mapping needs, existing information useful in updating the FIRMs, and ultimately recommendations for the development of updated Risk MAP and FIRM products.

The purpose of the Discovery Meeting(s) is to review any information previously provided by communities, State and regional agencies, and local stakeholders; discuss each community's floodplains and floodplain management activities, mitigation plans and projects, and flood risk concerns; and gather additional feedback for FEMA to consider when developing Risk MAP products, including the development of new FIRMs where needed.

Appendices E through H include the Discovery Meeting preparation and meeting materials:

- Meeting Agenda/Minutes (Appendix E: *Discovery Meeting Agenda*)
- Meeting Sign-In sheet (Appendix F: *Discovery Meeting Sign-In Sheet*)
- Meeting Presentations (Appendix G: *Discovery Presentation*)
- Discovery Maps and Stream Matrices (Appendix H: *Discovery Meeting Data Worksheets and Stream Matrices*)

Webinars

WebEx No.1 sessions were held August 13-15, 2013. These meetings were held via WebEx/conference call. This first WebEx was to introduce the planning team, request feedback from the municipalities, counties, and regional groups within the project area, and to determine what additional local floodplain and hazard risk data were available and who should be included in the process. Representatives from Cayuga, Genesee, Herkimer, Jefferson, Lewis, Monroe, Niagara, Onondaga, Ontario, Oswego, St. Lawrence, and Wayne Counties; USACE, the Nature Conservancy, and Regional Planning Commissions attended.

The participants were asked if there were additional stakeholders that should be added to the list. Several participants suggested the Cooperative Extensions and Soil and Water Conservation Districts (SWCD) in each county be invited. It was also suggested the following stakeholders be added to the distribution lists:

- The Onondaga Planning and Environmental Health
- Finger Lakes Protection Alliance
- Northern Oneida County Council of Governments
- Black Creek Watershed Coalition
- Cayuga Creek Watershed Coalition

Meeting presentation materials are available here:

<https://www.rampp-team.com/documents/newyork/Discovery Kickoff Meeting Lake Ontario Watershed 2013.pdf>

WebEx No.2 sessions were held September 17-20, 2013. These seven meetings were held via WebEx/conference call. This second WebEx was to request feedback from the municipalities, counties, and regional groups within the project area, and to determine what additional local floodplain and hazard risk data were available and should be included in the process.

The second half of the meeting was interactive, with community maps shown on the meeting screen and participants discussing floodplain mapping needs within their communities. Floodplain mapping needs and areas of concern included areas that experience flooding, locations of bridge/culvert replacements, areas where FEMA maps are inaccurate or do not exist, etc. To further expand on this discussion, participants were asked to complete and return the data worksheets to supplement the interactive discussion.

Attendees included representatives from Cayuga, Genesee, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Monroe, Niagara, Onondaga, Ontario, Orleans, Oswego, St. Lawrence, Wayne, and Wyoming Counties; USACE; the Nature Conservancy; SWCDs and Regional Planning Commissions.

Meeting presentation materials are available here:

<https://www.rampp-team.com/documents/newyork/LakeOntarioWatershedDiscovery 2ndMeetingPresentation 09-19-2013.pdf>

In-Person Meetings

In-person meetings are to facilitate discussion about study needs, mitigation project needs, desired compliance support, and local flood risk awareness efforts. Attendees, including all affected communities and selected other stakeholders, were asked to cooperatively identify Areas of Concern within the Oak Orchard-Twelvemile Watershed.

For the Oak Orchard-Twelvemile Watershed, the in-person meetings were held on Tuesday November 19, 2013, at 9:30AM and 2:00PM and Wednesday November 20, 2013, at 9:30AM and 2:30PM. In addition, representatives of FEMA, various State agencies, county officials, and several non-governmental organizations attended these sessions. Communities represented at the in-person meetings included:

- Town of Oakfield (Genesee County)
- Village of Brockport (Monroe County)
- Town of Gates (Monroe County)
- Town of Greece (Monroe County)
- Village of Hilton (Monroe County)
- Town of Parma (Monroe County)
- Town of Sweden (Monroe County)

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- Town of Cambria (Niagara County)
- Town of Lewiston (Niagara County)
- City of Lockport (Niagara County)
- Town of Lockport (Niagara County)
- Village of Middleport (Niagara County)
- Town of Porter (Niagara County)
- Town of Albion (Orleans County)
- Village of Albion (Orleans County)
- Town of Barre (Orleans County)
- Town of Kendall (Orleans County)
- Village of Lyndonville (Orleans County)
- Town of Murray (Orleans County)
- Town of Ridgeway (Orleans County)
- Town of Shelby (Orleans County)
- Town of Yates (Orleans County)

A copy of the sign-in sheets and the agendas for these meetings is available in the appendices.

At the start of the meetings a PowerPoint presentation was delivered. The PowerPoint presentation is located in Appendix G: *Discovery Presentation*. The second half of the meeting was interactive and included breakout sessions during which community officials and stakeholders met with representatives from FEMA/NYSDEC/RAMPP to discuss the following:

- What are areas of recent or planned development or high growth or other significant land changes?
- What other flood risks are there?
- What other mitigation plans and projects are there?
- What are your community's concerns?
- How can we (both FEMA and you) communicate risk within your community and increase resilience from floods?

Meeting presentation materials are available here:

https://www.rampp-team.com/documents/newyork/LakeOntario_Presentation_Final.pdf

Discovery Process Outcomes

Table 24: *Summary of Community Floodplain Mapping Needs* captures the ongoing discussion of needs that took place during the Discovery process via data worksheets, virtual meetings, community contacts, and the in-person meetings. This table highlights the communities that participated in the planning, provided information on the Data Worksheets, and noted specific needs related to their effective FIRMs. Appendix H of this document includes a summary of the discussions in each of the communities that participated in the Discovery Meetings and/or submitted Data Worksheets. The CNMS database entries also include larger construction projects that were noted during the meetings with communities during 2013.

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Twenty-six of the communities within the study area submitted Data Worksheets summarizing their available data and flood mapping needs. Nine communities noted that their current FIRMs accurately represent flooding in their communities.

Monroe and Niagara Counties have digital floodplain products and have noted concerns with the digital products due to LiDAR accuracy and lack of updated studies. Genesee and Orleans Counties do not have digital floodplain products. The current paper FIRMs are not usable for interpretation and determinations. At a minimum, digital products would assist the communities with their floodplain management.

It should be noted that the City of Rochester and Town of Byron documented needs within their multiple watersheds and this information has been captured within the other Lake Ontario Watershed Discovery Reports and in CNMS. The Town of Byron has noted that the flood studies stop at the adjoining community boundaries and do not continue into the town.

Concurrent to this report, the USDA NRCS has an Oak Orchard Creek Watershed project in the planning and construction phase.

Table 24: Summary of Community Floodplain Mapping Needs

County	Community	Effective Date	Submitted Data Worksheet and Mapping Needs	Current FIRMs Format (Paper or Digital)	Needs Captured in CNMS Database	Current Maps Accurate for Needs	Request for Training	Attended WebEx	Attended In-Person Meeting	Summary of Needs/ Map Update Justification
GENESEE	ALABAMA, TOWN OF	11/18/1983	No	Paper	Yes	N/A	N/A	No	No	- Information provided by County: New industry/commercial development - Restudy on Whitney Creek
	ELBA, TOWN OF	6/4/1976	No	Paper	No data gathered from Community due to lack of participation					
	VILLAGE OF ELBA	1/20/1984	Yes	Paper	No	Yes	No	No	No	- None
	OAKFIELD, TOWN OF	5/25/1984	Yes	Paper	Yes	No	Yes	No	Yes	- Culvert and bridge replacements - Industrial development - Beaver dams cause significant problems - Mining areas. Mines closed and being flooded by NYSDEC - All four flooding sources in Village need to be restudied and are priority for Town and Village. - Maltby Road SFHA is overstated and needs a detailed study - Flooding in NW portion of town - Stream cleaning needs to be completed on Oak Orchard
	OAKFIELD, VILLAGE OF	3/23/1984	No	Paper	Yes	N/A	N/A	No	No	
MONROE	BROCKPORT, VILLAGE OF	8/28/2008	Yes	Digital	Yes	Yes	No	Yes	Yes	- Political boundary/basemap changes - Problematic culvert - State purchasing land from Village for maintenance
	CLARKSON, TOWN OF	08/28/2008	No	Digital	No data gathered from Community due to lack of participation					

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County	Community	Effective Date	Submitted Data Worksheet and Mapping Needs	Current FIRMs Format (Paper or Digital)	Needs Captured in CNMS Database	Current Maps Accurate for Needs	Request for Training	Attended WebEx	Attended In-Person Meeting	Summary of Needs/ Map Update Justification
MONROE (CONT'D)	GATES, TOWN OF	08/28/2008	Yes	Digital	Yes	No	Yes	No	Yes	- Round Pond Creek maps are inaccurate, piped stream not shown on maps. - Long Pond Creek town has H&H and has portions that are piped - Little Black Creek needs to be studied
	GREECE, TOWN OF	08/28/2008	Yes	Digital	Yes	No	Yes	Yes	Yes	- Town has a lot of development along the shoreline and is concerned with how the lake levels (IJC) will affect these properties. - Commercial development in several areas. South Point Land should be a floodplain. - Potential stormwater development areas. - Culvert modifications not illustrated on flood maps for Round Pond Creek and cause significant flooding. No analysis completed by State. - Areas of repetitive flooding but are not currently mapped on Fleming Creek. - Relocated stream - Bruch Creek drainage - Concentrations of LOMAs – area needs to be restudied - Townwide drainage studies not taken into account in current mapping - Irregularities in edge mapping with current maps - Unmapped areas (Gores) between the towns of Greece and Gates that need to be continuous

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County	Community	Effective Date	Submitted Data Worksheet and Mapping Needs	Current FIRMs Format (Paper or Digital)	Needs Captured in CNMS Database	Current Maps Accurate for Needs	Request for Training	Attended WebEx	Attended In-Person Meeting	Summary of Needs/ Map Update Justification
MONROE (CONT'D)	HAMLIN, TOWN OF	08/28/2008	No	Digital	No data gathered from Community due to lack of participation					
	HILTON, VILLAGE OF	8/28/2008	Yes	Digital	Yes	No	No	No	Yes	- Bridge and culvert replacements - Tollwood Ditch unmapped and needs to be mapped. Floods area and causes issues. - Flood-control structure causes significant narrowing to Salmon Creek that is not shown on maps (9/2013)
	OGDEN, TOWN OF	08/28/2008	Yes	Digital	Yes	No	No	Yes	No	- No mapping between Washington Street/South of the canal (Hamlet of Adams Basin). There is flood study information available for this area Tributaries to Salmon Creek. Need detailed study. - Southeastern portion of the Town, near Rt. 33/Buffalo Road experiences development-current maps are not correct. Need study.
	PARMA, TOWN OF	08/28/2008	Yes	Digital	Yes	No	Yes	No	Yes	- Political boundary/base map changes - Commercial and residential development - Bridge and culvert replacements - Flooding issues along Oak Orchard Creek at Burrit Rd - CEHA - Wind gage by Channel 13 - East Creek impacts residents

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County	Community	Effective Date	Submitted Data Worksheet and Mapping Needs	Current FIRMs Format (Paper or Digital)	Needs Captured in CNMS Database	Current Maps Accurate for Needs	Request for Training	Attended WebEx	Attended In-Person Meeting	Summary of Needs/ Map Update Justification
MONROE (CONT'D)	SPENCERPORT, VILLAGE OF	8/28/2008	Yes	Digital	No	Yes	No	Yes	No	- No Needs
	SWEDEN, TOWN OF	08/28/2008	No	Digital	Yes	No	N/A	No	Yes	- Flooding of Brockport Creek may be more extensive than shown on maps. Homes are outside of SFHA.
NIAGARA	BARKER, VILLAGE OF	9/17/2010	No	Digital	No data gathered from Community due to lack of participation					
	CAMBRIA, TOWN OF	9/17/2010	Yes	Digital	No	Yes	No	No	Yes	- No Needs
	HARTLAND, TOWN OF	9/17/2010	No	Digital	No data gathered from Community due to lack of participation					
	LEWISTON, TOWN OF	9/17/2010	Yes	Digital	Yes	No	Yes	No	Yes	- Cayuga Creek restudy - Gill Creek study on Indian reservation
	LEWISTON, VILLAGE OF	9/17/2010	No	Digital	No data gathered from Community due to lack of participation					
	LOCKPORT, CITY OF	9/17/2010	No	Digital	N/A	N/A	N/A	No	Yes	- None Noted
	LOCKPORT, TOWN OF	9/17/2010	Yes	Digital	Yes	Yes	No	No	Yes	- Culvert replacement
	MIDDLEPORT, VILLAGE OF	9/17/2010	Yes	Digital	Yes	Yes	Yes	No	Yes	- Future development - Stormwater issues
	NEWFANE, TOWN OF	9/17/2010	Yes	Digital	No data gathered from Community due to lack of participation					
	PORTER, TOWN OF	9/17/2010	Yes	Digital	Yes	Yes	Yes	No	Yes	- Development concentration and concerns with septic systems - New culverts - High erosion along Lake Ontario, Niagara River, and Fourmile Creek - Rebuilds along shore/lakefront - H&H along stream near Creek Lane, and Lockport Road
	ROYALTON, TOWN OF	9/17/2010	No	Digital	No data gathered from Community due to lack of participation					
	SOMERSET, TOWN OF	9/17/2010	Yes	Digital	No	Yes	No	Yes	No	-No Needs
	WILSON, TOWN OF	9/17/2010	No	Digital	No data gathered from Community due to lack of participation					
	WILSON, VILLAGE OF	9/17/2010	No	Digital	No data gathered from Community due to lack of participation					
	YOUNGSTOWN, VILLAGE OF	9/17/2010	No	Digital	No data gathered from Community due to lack of participation					

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County	Community	Effective Date	Submitted Data Worksheet and Mapping Needs	Current FIRMs Format (Paper or Digital)	Needs Captured in CNMS Database	Current Maps Accurate for Needs	Request for Training	Attended WebEx	Attended In-Person Meeting	Summary of Needs/ Map Update Justification
ORLEANS	ALBION, TOWN OF	8/8/1980	Yes	Paper	Yes	No	Yes	Yes	Yes	- General quality of the flood maps for the town is poor and need updated/digital maps with some elevation and usable scale - Political boundary/base map changes - Culvert and bridge replacements - Seasonal flooding - Marsh Creek stops at political boundary and needs to be studied in Village - West Branch Sandy Creek #1 needs to be restudied
	ALBION, VILLAGE OF	11/30/1979	Yes	Paper	Yes	No	Yes	No	Yes	
	BARRE, TOWN OF	10/15/1981	Yes	Paper	Yes	No	No	No	Yes	- FIRMs were completed prior to drainage ditches - Underground pipes - Flooding throughout town - Culvert replacements - Oak Orchard Creek, Unnamed Stream 1 & 2 are highest priorities
	CARLTON, TOWN OF	11/1/1978	No	Paper	No data gathered from Community due to lack of participation					
	CLARENDON, TOWN OF	1/31/1983	Yes	Paper	No	No	No	No	No	- Participating NFIP community, but maps have not been adopted - No needs noted on data worksheet
	GAINES, TOWN OF	6/8/1984	No	Paper	Yes	N/A	N/A	No	No	- Bridge and culvert replacements
	HOLLEY, VILLAGE OF	11/30/1979	No	Paper	Yes	N/A	N/A	No	No	- Stormwater problems throughout town. Phase III of storm sewer started in 2002.

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County	Community	Effective Date	Submitted Data Worksheet and Mapping Needs	Current FIRMs Format (Paper or Digital)	Needs Captured in CNMS Database	Current Maps Accurate for Needs	Request for Training	Attended WebEx	Attended In-Person Meeting	Summary of Needs/ Map Update Justification
ORLEANS (CONT'D)	KENDALL, TOWN OF	5/1/1978	Yes	Paper	Yes	Yes	Yes	No	Yes	- Residential summer homes on Lake Ontario - Overstated floodplain on Sandy Creek - NYSDEC file notes: 1987 study and 2 bridge replacements by DOT were completed on Sandy Creek and not on the current maps. DOT designs indicate significantly lower flows than on the maps and restudy requested. Calculations provided.
	LYNDONVILLE, VILLAGE OF	9/16/1981	Yes	Paper	Yes	No	Yes	No	Yes	- Political boundary/base map changes - R/R bridge removed - H&H studies available - Future development downstream of dam - Johnson Creek needs to be a detailed study
	MEDINA, VILLAGE OF	3/28/1980	No	Paper	Yes	N/A	N/A	No	No	- Cannot make determinations based on paper maps. Need BFEs.
	MURRAY, TOWN OF	3/21/1980	Yes	Paper	Yes	No	Yes	No	Yes	- Ice buildup on Lake and seasonal flooding
	RIDGEWAY, TOWN OF	9/14/1979	Yes	Paper	Yes	No	Yes	No	Yes	- Maps not very accurate and cannot use for determinations - Oak Orchard Creek needs BFEs to continue into Medina - Industrial development

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ORLEANS (CONT'D)	SHELBY, TOWN OF	12/22/1983	Yes	Paper	Yes	No	Yes	No	Yes	- Maps inaccurate and unusable - Oak Orchard Creek needs restudy - Fish Creek needs restudy - Areas of flooding throughout town
	YATES, TOWN OF	9/29/1978	Yes	Paper	Yes	No	Yes	No	Yes	- Paper maps not usable and is a problem, need digital product with correct road names - Bridge and culvert replacements - Shoreline protections on Lake Ontario

VI. Risk MAP Projects and Needs

FEMA's Risk MAP allows communities to make informed mitigation decisions by providing products and technologies that communicate and visualize risks. Risk MAP also equips communities with the information and tools they need to develop effective mitigation.

Coastal Studies

Coastal flood hazard analyses and mapping will be performed for all communities along the shoreline of Lake Ontario. Below is a summary of data that will be collected and analysis that will be performed:

1) Creation of Bathymetric and Topographic Map Data Inventory

Topographic data for the coastal areas to be studied will be used for coastal analysis, floodplain boundary delineation, and/or testing of floodplain boundary standard compliance. The topographic data used will be based on the data collected as part of this Discovery process, and will depend on the date and accuracy of existing topographic data. Only topographic data that is of better quality than that of the original study or effective studies will be used. New topographic and bathymetric LiDAR, RGB imagery, and hyperspectral imagery will be used for the coastal study areas and will replace the existing datasets.

2) Base Map Acquisition

Base map data for all counties, including data collected during this Discovery process as an initial inventory will be collected and organized. The necessary permissions from the map sources will be obtained to allow FEMA to use and distribute hard-copy and digital map products using the digital base map. Base map data must comply with Base map data must comply with FEMA's Guidelines and Specifications (G&S).

3) Coastal Flood Hazard Analysis

Response-based computational approaches outlined in FEMA G&S Appendix D.3, dated May 2012 (FEMA, 2012), will be used to perform coastal flood hazard analysis for the Lake Ontario shoreline and areas subject to coastal flooding. The coastal flood hazard analyses include the following components:

- Wave setup
- Erosion
- Wave runup
- Wave overtopping
- Overland wave propagation
- Primary frontal dune identification (where applicable)

A transect-based approach for assessing coastal flood risks along Lake Ontario will be used.

The 1.5-foot breaking wave height will be selected from the Wave Height Analysis for Flood Insurance Studies results and used to define the LiMWA as described in FEMA Procedure Memorandum No. 50, updated in 2012.

Coastal flood hazards will be mapped as outlined in FEMA's G&S Appendix D.3 dated May 2012 (FEMA, 2012). Flood hazard mapping will extend to the landward limit of coastal flooding as a result of waves and storm surge.

Coastal flood maps (or work maps) will be produced for the study area. The work map will include the 1- and 0.2-percent-annual-chance SFHA, Coastal High Hazard (Zone VE) and Coastal A Zone (Zone AE), BFEs, and LiMWA. Communities will be provided with an opportunity to review the work maps after the coastal modeling is complete and before FEMA approves of and adopts the updated coastal flood maps.

Mitigation Projects

During the Discovery process, FEMA, the NYSDEC, and RAMPP met with the communities and discussed their recent and current mitigation projects. Based on the results of the Lake Ontario coastal study, the communities can determine if their existing projects and programs are adequate or if they would benefit from additional mitigation measures.

Technical assistance is available through Risk MAP to help communities identify, select, and implement activities to support mitigation planning and risk reduction. Activities could include (but are not limited to):

- Advising in the creation of initial HMPs
- Advising in the update of existing HMPs
- Training to improve a community's capabilities for reducing risk
- Assisting in incorporating flood risk datasets and products into potential and effective community legislation, guidance, regulations, procedures, etc.
- Assisting with creating, acquiring, and incorporating GIS data into potential and effective maps, planning mechanisms, emergency management procedures, etc.
- Facilitating the identification of data gaps and interpreting technical data to identify risk reduction deficiencies that should be corrected

Compliance

FEMA uses a number of tools to determine a community's compliance with the minimum regulations of the NFIP. Among them are CACs and CAVs. These tools help assess a community's implementation of its floodplain management regulations and identify any deficiencies and/or violations.

C.1 Coastal Special Flood Hazard Areas

The Lake Ontario Coastal Flood Hazard study analysis may result in new SFHAs, which are defined as areas that will be inundated by a flood event having a 1-percent chance of being equaled or exceeded in any given year. The 1-percent-annual-chance flood is also referred to as the base flood or 100-year flood. SFHAs labeled as Zone AE have been studied by detailed methods and show BFEs. SFHAs labeled as Zone VE are along coasts and are subject to additional hazards due to storm-induced velocity wave action. BFEs derived from detailed hydraulic analyses are shown within these zones.

The NFIP shows coastal flood hazards in two different zones on its FIRMs:

- Zone VE, where the delineated flood hazard includes wave heights equal to or greater than 3 feet; and
- Zone AE, where the delineated flood hazard includes wave heights less than 3 feet.

These zones were discussed in greater detail during the Discovery Meetings, as the updated coastal analysis results may show that these flood risks exist along the Lake Ontario shoreline.

C.2 Building Requirements in VE Zones

The zone designation and the BFE are critical factors in determining which requirements apply to a building and, as a result, how the structure must be built. The NFIP minimum requirements for buildings constructed in Zone VE (Coastal High Hazard Areas) are as follows:

1. The building must be elevated on pile, post, pier, or column foundations.
2. The building must be adequately anchored to the foundation.
3. The building must have the bottom of the lowest horizontal structural member at or above the BFE.
4. The building design and method of construction must be certified by a design professional.
5. The area below the BFE must be free of obstructions.
6. Enclosures must be made of lightweight wood lattice, insect screening, or breakaway walls.

Communities participating in the NFIP that have mapped VE Zones must adopt floodplain management regulations that meet or exceed the minimum NFIP requirements described above.

C.3 Limit of Moderate Wave Action

Post-storm field investigations and laboratory tests have confirmed that waves as small as 1.5 feet can cause significant damage to structures that are constructed without consideration of coastal hazards. Additional flood hazards associated with coastal waves include floating debris, high velocity flow, erosion, and scour, which can cause damage to Zone AE-type construction in these coastal areas.

To help community officials and property owners recognize this increased potential for damage due to wave action in the AE Zone, FEMA issued Procedure Memorandum 50 in December 2008, which provides guidance on identifying and mapping the 1.5-foot wave height line, referred to as the LiMWA. The LiMWA alerts property owners on the inland side of this line that although their property is in a Zone AE area, it may also be affected by waves 1.5 feet or higher. Consequently, it is important to be aware of the area between this inland limit and the Zone VE boundary, as the area may face a high risk—though not as high as Zone VE. Figure 8 explains the LiMWA zone location.

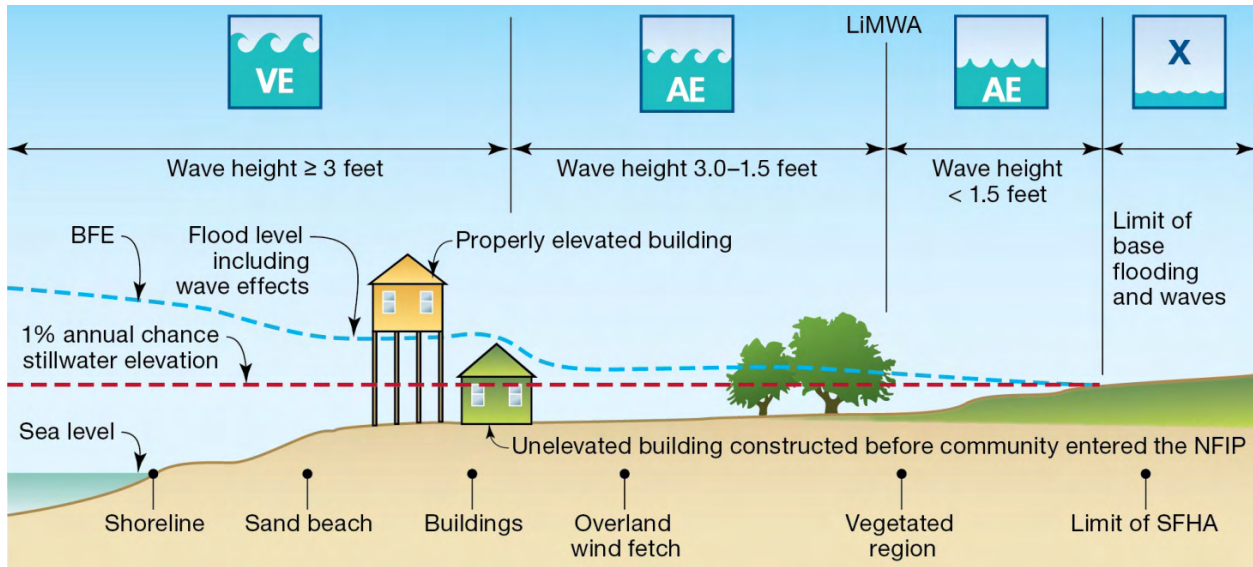


Figure 8: Limit of Moderate Wave Action

A new line layer will be added to the FIRM Database to accommodate the LiMWA features. The new layer will be depicted on updated FIRMs as two black dots and three white dashed lines in a sequential pattern. The LiMWA will be identified in the FIRM legend as “Limit of Moderate Wave Action,” and a note will be included in the “Notes to Users” section on the map panel to explain the LiMWA boundary.

Figure 9 is an example FIRM showing the delineated LiMWA. The area in Map A shows the delineation of the LiMWA in an area where the predominant coastal flood hazard is overland wave propagation. Map B shows delineation of the LiMWA in a region where the major coastal flood hazard is wave breaking and runup.

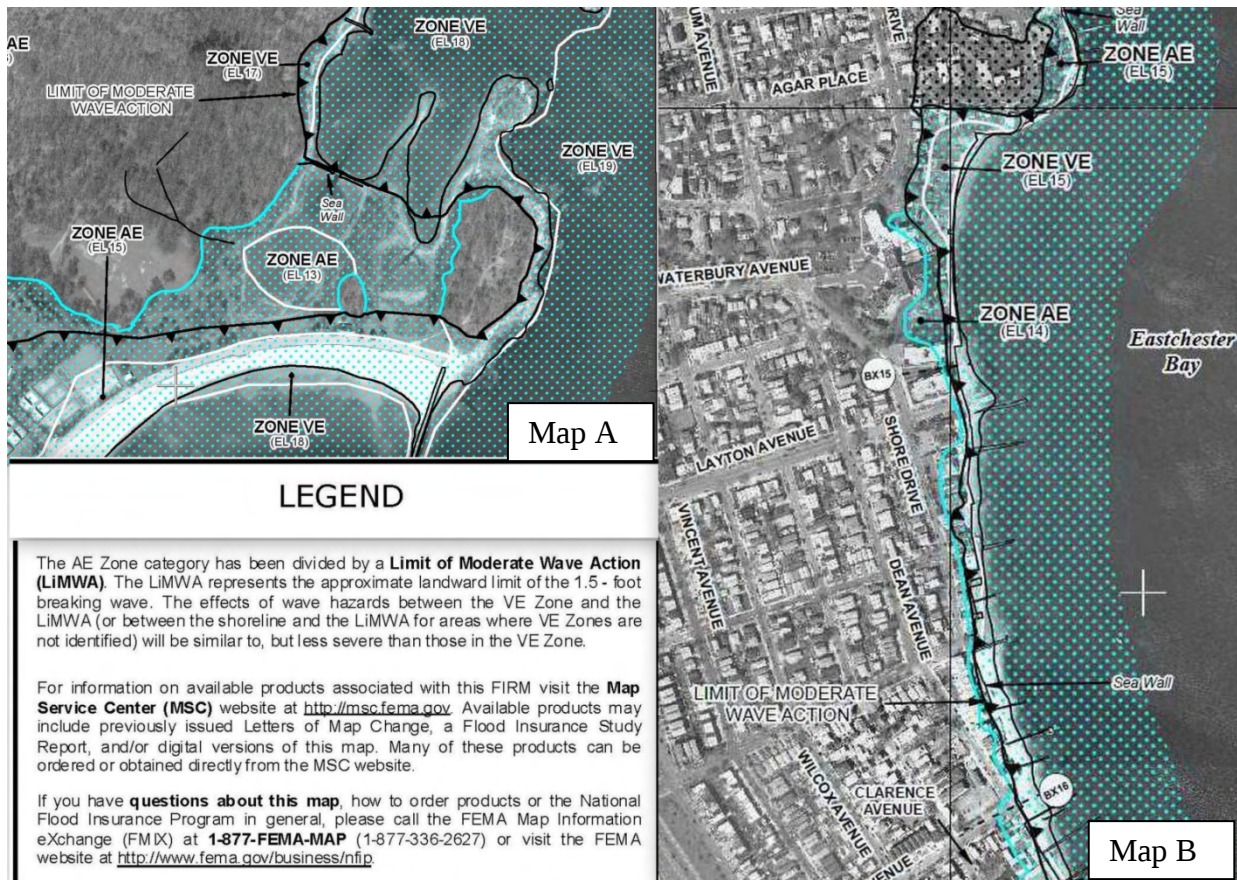


Figure 9: Example FIRM showing LiMWA

While FEMA does not impose floodplain management requirements based on the LiMWA, the LiMWA is provided to help communicate the higher risk that exists in that area. Because the 1.5-foot breaking wave in the LiMWA zone can potentially cause foundation failure, communities are encouraged to adopt building construction standards similar to those in Zone VE in those areas. For communities that do adopt Zone VE building standards in the area defined by the LiMWA, additional CRS credits are available. CRS credits can lower insurance premiums for residents and business owners. Additional information on CRS can be found online at <http://www.fema.gov/national-flood-insurance-program/community-rating-system>.

Mapping the LiMWA provides community officials and other stakeholders with additional important flood risk details to consider when buying/ developing, mitigating, or enforcing floodplain management regulations in coastal flood hazard areas.

Residents and business owners living or working in the LiMWA zone should be aware of the potential wave action along with floating debris, erosion, and scour that could cause significant damage to their property. They are encouraged to build safer and higher than the minimum local requirements in order to reduce the risk to life and property.

While the risk of damage is higher between the LiMWA line and the Zone VE line than it is in other parts of the coastal AE Zone, the NFIP flood insurance rates currently do not differ from other AE Zone rates.

The Federal mandatory purchase requirement does apply in these zones, and property owners are encouraged to carry coverage equivalent to the replacement cost of their building and to include contents coverage.

For additional background information on the LiMWA, please refer to FEMA Procedure Memorandum No. 50 at www.fema.gov/library/viewRecord.do?id=3481.

Communication

Throughout this Discovery process, community representatives and local stakeholders indicated the need to be kept informed about the results of Discovery, the upcoming coastal flood study, and opportunities for public input throughout the study process. As a result of communication to date, several new stakeholders have been identified and added to the master contact database for this study.

Unmet Needs

The Lake Ontario Discovery process did identify unmet needs. During many discussions with community officials, the need or want of a digital mapping product was raised. Genesee and Orleans Counties do not have digital maps and the information depicted on the maps is not current (location of flooding and roads). This makes mitigation actions and floodplain management difficult for those community officials.

The types of needs catalogued are further summarized in Section III: Summary of Data Analysis, subsection for CNMS and NFIP Mapping Needs. At this time, all needs identified have been included in CNMS and this Discovery Report.

VII. Conclusion

Communities have expressed concern with current mapping accuracy, digital and paper products, and lack of information to make accurate floodplain management determinations. As noted in the Demographics Section of this Report, the watershed's population growth offers local jurisdictions the opportunity for thoughtful floodplain mitigation and management. The quality of the available flood data and lack of digital products makes floodplain management and mitigation problematic. Continued vigilance must be maintained so that as the economy improves, good building practices continue for communities within the watershed.

Monroe County provided the most CNMS requests for the watershed, followed by Orleans County. The majority of the requests are for updated detailed studies based on changes to the hydraulic condition, floodplain delineation errors, need for digital products and population changes or growth in the floodplain. Over 35 different stream extents have been included in the CNMS database to FEMA; with multiple requests for Lake Ontario, Oak Orchard Creek, Salmon Creek, Sandy Creek, and West Creek.

Stream extents that have consistently been discussed as priority needs (as shown in Table 24: *Summary of Community Floodplain Mapping Needs*) and warrant updated studies include East Creek, Brockport Creek, Cayuga Creek, Gill Creek, Lake Ontario, Niagara River, Fourmile Creek, Marsh Creek, West Branch Sandy Creek, Oak Orchard Creek, Johnson Creek, and Fish Creek.

In general, a particular emphasis on joining the NFIP's CRS program would benefit these and all watershed communities. There seems to be a great deal of misinformation and lack of communication as to what the CRS is; if a community is eligible for membership; and what level of effort is required to make the CRS beneficial for a community. Local communities may wish to consider pooling resources/efforts or work on a countywide-basis to ease the effort of complying with the requirements of joining the CRS program. All communities within the Oak Orchard-Twelvemile Watershed expressed an interest within their HMPs to participate in the CRS.

In addition, the prevalence of smaller developments (often as limited as two building sites) planned across the watershed may be a challenge to effective floodplain management, as these micro-developments can easily slip through regulatory cracks. Local officials need to be aware that the NFIP minimum building standards apply to all construction in the SFHA. The NFIP also has additional reporting regulations for projects consisting of five lots or 50 acres, whichever is smaller ([44 CFR 60.3\(b\)\(3\)](#)). Information on the NFIP's building requirements in the SFHA can be found in the NYSDEC's *Floodplain Construction Requirements in New York State* available at http://www.dec.ny.gov/docs/water_pdf/floodplainconstruction.pdf.

VIII. Deliverables

Communications

Contacts

Stakeholders

Notifications/Invitations

A. Discovery Meeting Notification via emails (Webex) and paper copies (in person meetings)

B. Meeting Notes Distributed via email and through RAMPP Website

Information Exchange

Data Questionnaires

Discovery Meeting

Agenda

Presentation

Sign-In Sheet

Discovery Meeting Map and other related Maps

Meeting Minutes

Evaluations

Discovery Deliverables

Report

Project Area Map

Final Discovery Map

Tabular Data, including Data Sources and Mapping Needs

Geodatabase

CNMS Database Updates

IX. Appendices

X. Attachments

XI. References

Federal Emergency Management Agency. www.fema.gov

Federal Emergency Management Agency, Map Service Center.
<https://msc.fema.gov/webapp/wcs/stores/servlet/FemaWelcomeView?storeId=10001&catalogId=10001&langId=-1>.

Federal Emergency Management Agency, HAZUS Flood Average Annualized Loss Usability Analysis. National Discovery Repository.

Federal Emergency Management Agency, Disasters,
http://www.fema.gov/news/disasters_state.fema?id=42.

Floodsmart, the official site of the National Flood Insurance Program (NFIP):
www.floodsmart.gov

National Committee on Levee Safety: www.nfrmp.us/ncls

New York State Department of Environmental Conservation: <http://www.dec.ny.gov/>

NFIP Reform: www.fema.gov/bw12

Risk Assessment, Mapping and Planning Partners: www.RAMPP-team.com/ny.htm

U.S. Census Bureau, 2010, State and County Quick Facts, <http://quickfacts.census.gov/>,
accessed November 2012.

U.S. Fish and Wildlife, Coastal Barrier Resources System,
http://www.fws.gov/CBRA/Maps/Data_Disclaimer_Shapefiles.html

USGS National Water Information System: <http://nwis.waterdata.usgs.gov/ny/nwis/peak>

U.S. Department of Agriculture, NEW YORK Rapid Watershed Assessment Profile:
<http://www.nrcs.usda.gov/wps/portal/nrcs/main/ny/technical/dma/rwa/>